ENVIRONMENTAL ASSESSMENT OF THE LANDFILL COMPONENT OF HALTON'S SOLID WASTE MANAGEMENT SYSTEM

TRANSPORTATION ASSESSMENT

URBAN DOCUMENTATION CENTRE
RESEARCH UNIT FOR URBAN STUDIES
McMASTER UNIVERSITY
HAMILTON, ONTARIO

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TABLE OF CONTENTS

Section		Page
	SUMMARY	1
1.0	BACKGROUND	1-1
	1.1 Introduction	1-1
	1.2 Waste Zones	1-1
	1.3 Waste Disposal Scenario	1-2
2.0	HAULAGE ROUTES	2-1
	2.1 Introduction	2-1
	2.2 Site A	2-2
	2.3 Site B	2-3
	2.4 Site C	2-4
	2.5 Site D	2-4
	2.6 Site E	2-5
	2.7 Site F	2-6
3.0	SITE ACCESS REQUIREMENTS	3-1
	3.1 Introduction	3-1
	3.2 Site A	3-1
	3.3 Site B	3-2
	3.4 Site C	3-2
	3.5 Site D	3-2
	3.6 Site E	3-3
	3.7 Site F	3-3
4.0	TRAFFIC VOLUMES & ARRIVAL CHARACTERISTICS	4-1
	4.1 Introduction	4-1
	4.2 Existing Arrival and Weight Statistics - Burlington Landfill Site	4-2
	4.3 Vehicle Arrival Projections	4-3
5.0	TRAVEL TIMES AND DISTANCES	5-1
	5.1 Introduction	5-1
	5.2 Service and Operations Index	5-1
6.0	IMPACTS AND EVALUATION	6-1
	6.1 Introduction	6-1
	6.2 Site A	6-2
	6.3 Site B	6-3
	6.4 Site C	6-3
	6.5 Site D	6-4
	6.6 Site E	6-4
	6.7 Site F	6-5
	6.8 General Mitigation Aspects	6-6
	6.9 Summary of Evaluation	6-7

LIST OF ILLUSTRATIONS

		Following Page
Maps		
1.	Haulage Routes to Sites A, B & C (Existing Road Network)	2-8
2.	Haulage Routes to Sites D & E (Existing Road Network)	2-8
3.	Haulage Routes to Site F (Existing Road Network)	2-8
Exhibits		
1.	Required Road Improvements - Site A	3-3
2.	Required Road Improvements - Site B	3-3
3.	Required Road Improvements - Site C	3-3
4.	Required Road Improvements - Site D	3-3
5.	Required Road Improvements - Site E	3-3
6.	Required Road Improvements - Site F	3-3

LIST OF TABLES

Tables		
1.	1983 Arrival Statistics - Burlington Landfill Site Weekday Arrivals - By Vehicle Classification	4-2
2.	1983 Arrival Statistics - Burlington Landfill Site Saturday Arrivals - By Vehicle Classification	4-2
3.	1983 Arrival Statistics - Burlington Landfill Site Average Vehicle Arrivals Per Day	4-2
4.	1983 Weight Statistics (Tonnes) - Burlington Landfill Site Weekdays and Saturdays	4-2
5.	1983 Weight Statistics (Tonnes) - Burlington Landfill Site Average for Weekdays and Saturdays	4-2
6.	Waste Distribution by Zone (Landfill Component)	4-3

LIST OF TABLES (continued)

Tables		Following Page
7.	Number of Haulage Vehicle Trips Per Day (Design Condition) Average Weekday - One Way	4-3
8.	Number of Haulage Vehicle Trips Per Day (Design Condition) Average Saturday - One Way	4-3
9.	Travel Time from Zone Centroids to Sites	5-2
10.	Travel Distance from Zone Centroids to Sites	5-2
11.	Service & Operations: Total Vehicle - Minutes	5-2
12.	Service & Operations: Total Vehicle - Kilometres	5-2
13.	Service & Operations Index	5-2

APPENDICES

Appendix	
A.	Preliminary Cost Estimates for Road Improvements
B.	Assumed Road Improvements at Site Access Location
C.	Road Maintenance Costs
D.	School Bus Assessment
E.	Local Entrances on Main Haul Route (Site E)
F.	Rackground Traffic

SUMMARY

An assessment of the relative effects of hauling waste to the six Site Plan Areas was completed by considering the following two traffic aspects:

- Traffic Safety.
- Traffic Service and Operation.

The Site Plan Areas were compared utilizing these two transportation factors and an overall ranking (most preferred to least preferred) was developed. This ranking stressed the Traffic Safety factor since it is related to the high priority, 'overall' evaluation category of Public Health and Safety.

In order to develop likely or representative travel routes that haulage vehicles will utilize to access each Site Plan Area, the Region was divided into ten waste zones (three each for Burlington and Oakville, two each for Milton and Halton Hills). Routes of travel were identified from the centre of each waste zone to each of the six Site Plan Areas. Entrance locations into each site were selected that would minimize local impacts.

In general, each Site Plan Area is accessible via roads considered appropriate for haulage vehicles (e.g. highways, arterial roads). The exception is Site E which requires the use of local roads for access in the immediate Site Plan Area.

All sites are considered acceptable from a transportation standpoint and the differences with respect to Traffic Safety and Service/Operations are not significant.

A ranking with respect to both of these factors (most preferred to least preferred) is summarized below:

Rank	Site
1	D/F
3	A
4	B/C
6	E

1.0 BACKGROUND

1.1 Introduction

The transportation assessment related to the ranking of Sites and the selection of a preferred landfill site has considered two basic evaluation factors:

- Traffic Safety;
- Traffic Service and Operation.

Under the factor Traffic Safety, the assessment concentrated on two main aspects:

- use of local roads for haulage;
- potential conflicts along main haulage routes.

Under the factor Traffic Service and Operation, the following main aspects were considered in the assessment:

- use of local roads;
- standard and operating characteristics of main "feeder" route to the site;
- travel times and distances.

In all cases the Site Plan Areas were used in this assessment.

1.2 Waste Zones

In order to predict the likely spatial orientation of haulage vehicles related to any potential landfill site and to calculate comparative haulage travel times and distances, the Region was divided into ten waste zones as follows:

Burlington:	1.	North-West
	2.	South
	3.	North
Oakville:	4.	Northwest
	5.	South
	6.	Northeast
Milton:	7.	South
	8.	North
Halton Hills:	9.	West
	10.	East

These waste zones were developed considering the geographical characteristics of each of the area municipalities and their relationship to both the existing (and future) road network and the location of the Candidate Sites. Each of the ten zones has been represented by a zone centre located on the existing road network. The zone centres were used to approximate the origin of waste (start of haulage) from each zone. Waste statistics based on zone population and employment forecasts have been generated for each zone for selected years.

1.3 Waste Disposal Scenario

Three analysis years have been selected for the assessment of transportation aspects of landfilling: 1988, 1996 and 2008. The approximate waste quantities required to be landfilled from each zone were generated for each of these analysis years.

In 1988, the initial phase of the long term landfilling planning period, a seven month period of operation was assumed (June to December). No alternative method of disposal was assumed to be implemented (i.e., energy from waste) by the Region in the period between June 1988 and December 1996.

In 1996, the Region proposes to initiate an energy from waste (EFW) program. This will substantially reduce the waste quantities requiring landfilling between 1996 and 2008. The waste quantities for landfill have been generated for 2008 by assuming that fifty percent of total waste will be disposed of through energy from waste (EFW) facilities. The resultant landfill requirement (ash and non-combustible refuse) of the energy from waste facilities has not been considered in this transportation assessment.

2.0 HAULAGE ROUTES

2.1 Introduction

As indicated previously, the Region has been divided into ten waste zones in order to predict the spatial distribution of landfill bound vehicles within Halton. The most likely, or most representative, route between zone centre and the original Candidate Site has been identified. Consideration has been given to both the existing and future (approved) road network in determining haulage routes.

The following waste zones and zone centres have been developed:

Zone	Zone Centres
1. Burlington Northwest	Highway 403 at Waterdown Road
2. Burlington South	Q.E.W. at Guelph Line
3. Burlington North	Guelph Line at No. 3 Sideroad
4. Oakville Northwest	Highway 25 at Dundas Street
5. Oakville South	Trafalgar Road just south of Q.E.W.
6. Oakville Northeast	Dundas Street at Trafalgar Road
7. Milton South	Highway 25 at Steeles Avenue
8. Milton North	Guelph Line at No. 10 Sideroad
9. Halton Hills West	Highway 25 at Regional Road 10
10. Halton Hills East	Regional Road 11 at Regional Road 13

In developing haulage routes between these zones and the six Site entrances, all trips were assumed to originate at the zone centres. In fact, these zone centres are representative only of the haulage trip starts. Within each zone, the distribution of waste generators with respect to the designated zone centre will affect the accuracy of the identified haulage route. However, this technique for developing haulage routes is considered appropriate for a comparative assessment of relative transportation aspects among the six alternatives. The routes that have been identified are considered the most likely routes that landfill bound vehicles will be utilizing leaving each zone. In assigning vehicles to specific roads, preference has been given to roads considered more appropriate for haulage (arterials and highways).

Two future transportation components have been assumed "in place" in identifying haulage routes; Highway 403 (complete) and the Waterdown Road/ Highway 403 interchange. Although the timing of these new facilities is uncertain at this time, it was assumed that Highway 403 will be operational by 1996. Haulage routes for 1988 have been developed based on the existing road network and a Waterdown Road/Highway 403 interchange that allows for Waterdown Road access from the east off Highway 403.

For each of the Candidate Sites, ten representative routes (one from each waste zone) have been identified. These are described in detail in the following text. Haulage routes for 1988 are shown on Maps 1; 2 and 3.

2.2 Site A

Site A is situated south of future Highway 403, east of Trafalgar Road. The site entrance will be from Trafalgar Road. The following highway/road sections are considered the most likely route components for travel between the zone centres and the proposed Site A entrance (and where routes are different for years 1996/2008, they are noted).

Burlington Northwest

a) 1988

- Highway 403/Q.E.W./Highway 25/Dundas Street/Trafalgar Road.

b) 1996/2008

- Highway 403/Trafalgar Road.

Burlington South

a) 1988

- Q.E.W./Highway 25/Dundas Street/Trafalgar Road.

b) 1996/2008

- Q.E.W./Highway 25/Highway 403/Trafalgar Road.

Burlington North

a) 1988

- Guelph Line/Dundas Street/Trafalgar Road.

b) 1996/2008

- Guelph Line/Dundas Street/Highway 403/Trafalgar Road.

Oakville South

- Trafalgar Road.

Oakville Northwest

- Dundas Street/Trafalgar Road.

Oakville Northeast

- Trafalgar Road.

Milton South

- Steeles Avenue/James Snow Parkway/Highway 401/Trafalgar Road.

Milton North

- Guelph Line/Highway 401/Trafalgar Road.

Halton Hills East

- Regional Road 11/Trafalgar Road.

Halton Hills West

- Highway 25/Highway 401/Trafalgar Road.

2.3 Site B

Site B is situated south of Burnhamthorpe Road, west of Trafalgar Road. The site entrance will be from Trafalgar Road. The most likely route components for travel between the zone centres and Site B are identical to Site A.

2.4 Site C

Site C is situated south of Burnhamthorpe Road, east of Trafalgar Road. The site entrance will be from Trafalgar Road. The most likely route components for travel between the zone centres and Site C are identical to Site A.

2.5 Site D

Site D is situated south of Britannia Road, west of Highway 25. The site entrance will be from Highway 25. The following highway/road sections are considered the most likely route components for travel between the zone centres and Site D (where routes are different for years 1996/2008, they are noted).

Burlington Northwest

a) 1988

- Highway 403/Q.E.W./Highway 25.

b) 1996/2008

- Highway 403/Highway 25.

Burlington South

- Q.E.W./Highway 25.

Burlington North

- Guelph Line/Derry Road/Tremaine Road/Britannia Road/Highway 25.

Oakville South

- Q.E.W./Highway 25.

Oakville Northwest

- Highway 25.

Oakville Northeast

- Dundas Street/Highway 25.

Milton South

- Highway 25.

Milton North

- Guelph Line/Highway 401/Steeles Avenue/Highway 25.

Halton Hills East

- Regional Road 11/Trafalgar Road/Steeles Avenue/Highway 25.

Halton Hills West

- Highway 25/Steeles Avenue/Highway 25.

2.6 Site E

Site E is situated west of Tremaine Road, north of Britannia Road. The site entrance will be from Tremaine Road. The following highway/road sections are considered the most likely route components for travel between the zone centres and Site E (where routes are different for years 1996/2008, they are noted).

Burlington Northwest

a) 1988

- Highway 403/Q.E.W./Highway 25/Britannia Road/Tremaine Road.

b) 1996/2008

- Highway 403/Highway 25/Britannia Road/Tremaine Road.

Burlington South

- Q.E.W./Highway 25/Britannia Road/Tremaine Road.

Burlington North

- Guelph Line/Derry Road/Tremaine Road.

Oakville South

- Q.E.W./Highway 25/Britannia Road/Tremaine Road.

Oakville Northwest

- Highway 25/Britannia Road/Tremaine Road.

Oakville Northeast

- Dundas Street/Highway 25/Britannia Road/Tremaine Road.

Milton South

- Highway 25/Britannia Road/Tremaine Road.

Milton North

- Guelph Line/Highway 401/Highway 25/Steeles Avenue/Highway 25/Britannia Road/Tremaine Road.

Halton Hills East

- Regional Road 11/Trafalgar Road/Steeles Avenue/Highway 25/Britannia Road/Tremaine Road.

Halton Hills West

- Highway 25/Steeles Avenue/Highway 25/Britannia Road/Tremaine Road.

2.7 Site F

Site F is located north of the North Service Road, west of King Road. The site entrance will be from the North Service Road. The following highway/road sections are considered the most likely route components for travel between the zone centres and Site F (where routes are different for years 1996/2008, they are noted).

Burlington Northwest

- North Service Road.

Burlington South

- Q.E.W./Highway 403/Waterdown Road/North Service Road.

Burlington North

a) 1988

- Guelph Line/Q.E.W./Highway 403/Waterdown Road/North Service Road.

b) 1996/2008

- Guelph Line/Dundas Street/Highway 403/Waterdown Road/North Service Road.

Oakville South

- Q.E.W./Highway 403/Waterdown Road/North Service Road.

Oakville Northwest

a) 1988

- Highway 25/Q.E.W./Highway 403/Waterdown Road/North Service Road.

b) 1996/2008

- Highway 25/Highway 403/Waterdown Road/North Service Road.

Oakville Northeast

a) 1988

- Dundas Street/Highway 25/Q.E.W./Waterdown Road/North Service Road.

b) 1996/2008

- Dundas Street/Highway 25/Highway 403/Waterdown Road/North Service Road.

Milton South

a) 1988

- Highway 25/Q.E.W./Highway 403/Waterdown Road/North Service Road.

b) 1996/2008

- Highway 25/Highway 403/Waterdown Road/North Service Road.

Milton North

a) 1988

- Guelph Line/Q.E.W./Highway 403/Waterdown Road/North Service Road.

b) 1996/2008

- Guelph Line/Dundas Street/Highway 403/Waterdown Road/North Service Road.

Halton Hills East

a) 1988

- Regional Road 11/Trafalgar Road/Dundas Street/Highway 25/Q.E.W./Highway 403/Waterdown Road/North Service Road.

b) 1996/2008

- Regional Road 11/Trafalgar Road/Highway 403/Waterdown Road/North Service Road.

Halton Hills West

a) 1988

- Highway 25/Steeles Avenue/Highway 25/Q.E.W./Highway 403/Waterdown Road/North Service Road.

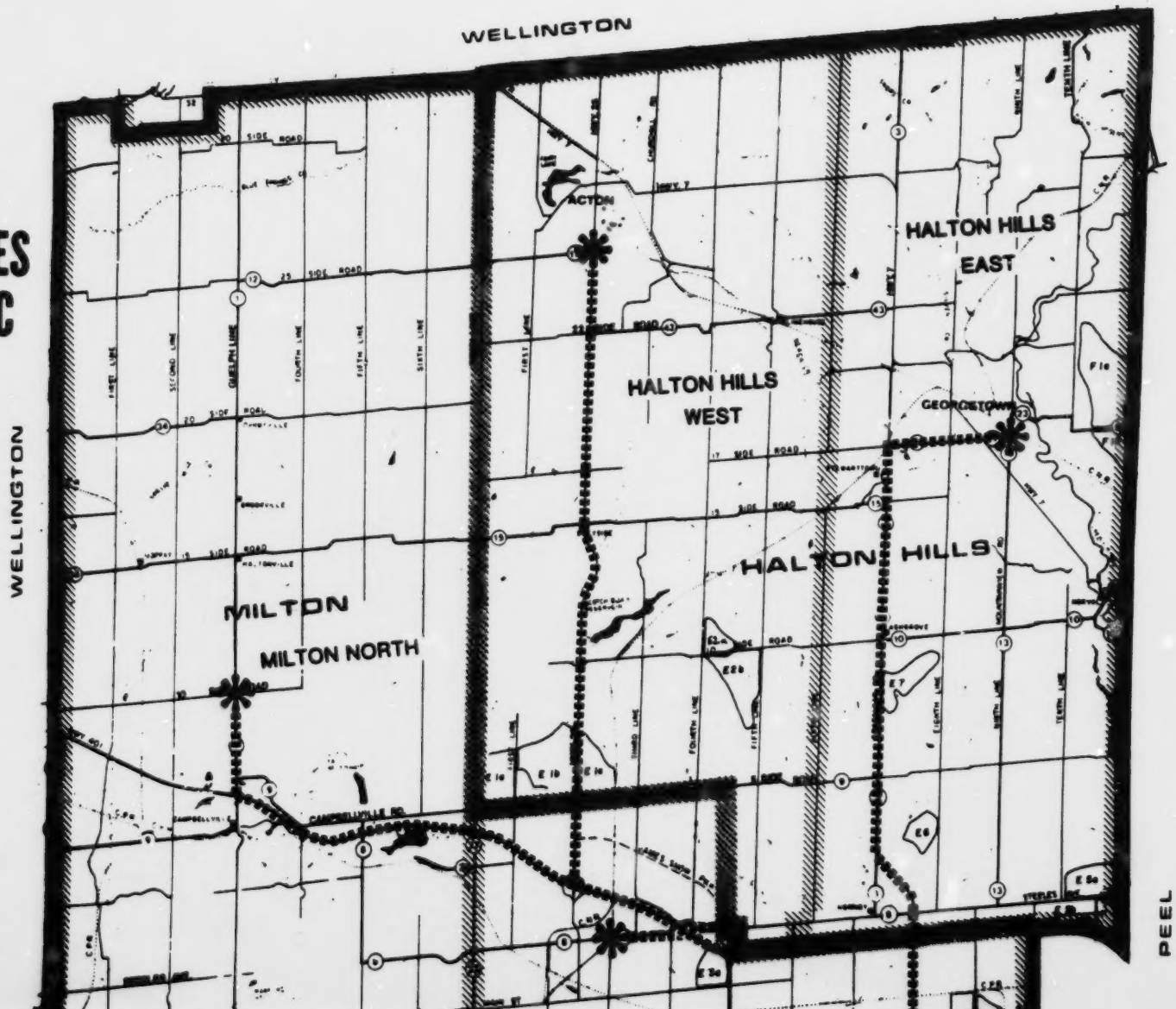
b) 1996/2008

- Highway 25/Steeles Avenue/Highway 25/Highway 403/Waterdown Road/North Service Road.

MAP 1

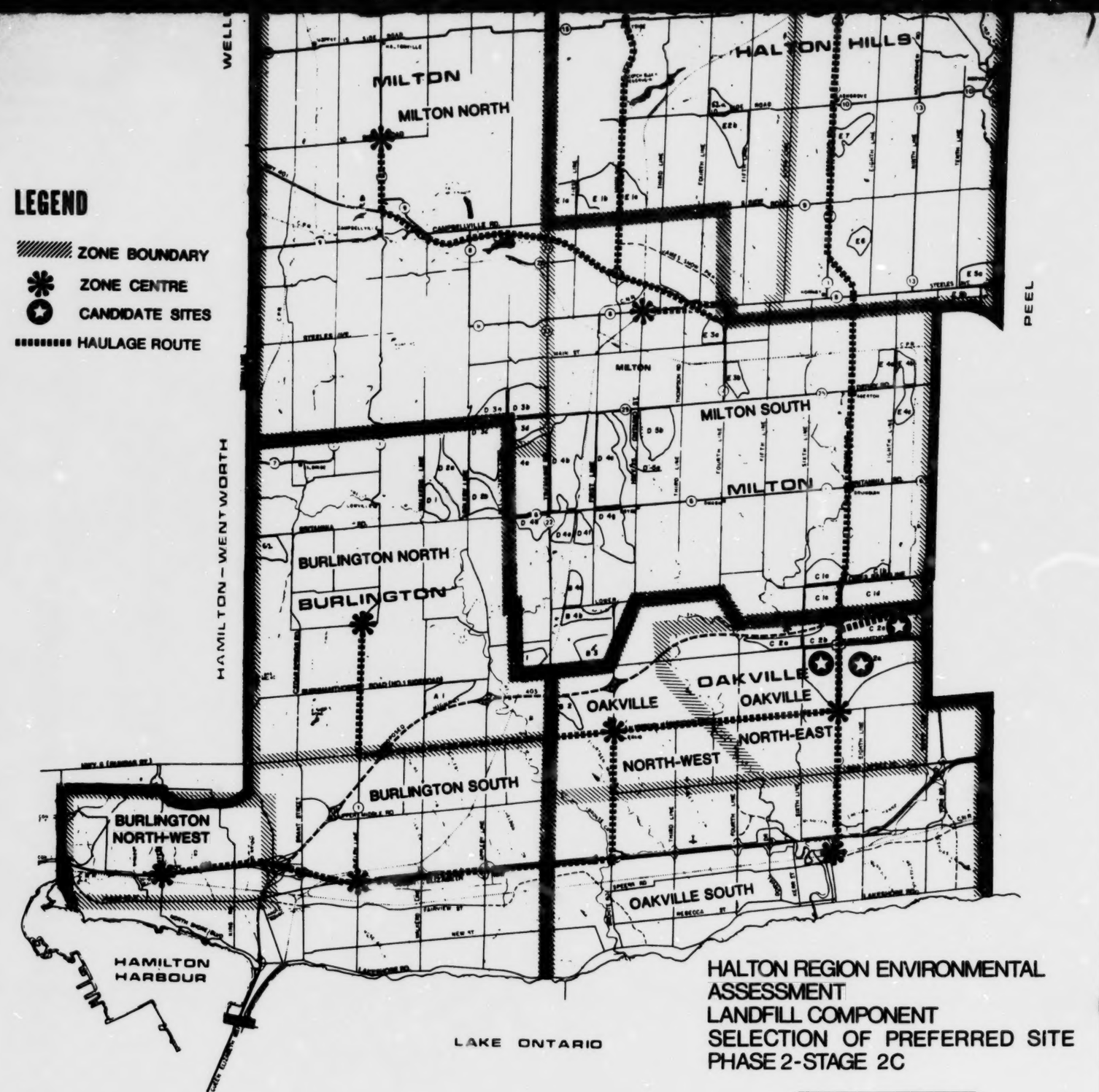
HAULAGE ROUTES TO SITES A, B, C

Giffels



LEGEND

- ZONE BOUNDARY
- ZONE CENTRE
- CANDIDATE SITES
- HAULAGE ROUTE



HALTON REGION ENVIRONMENTAL ASSESSMENT
LANDFILL COMPONENT
SELECTION OF PREFERRED SITE
PHASE 2-STAGE 2C

Walker Wright Young Associates Limited/Planning Consultants
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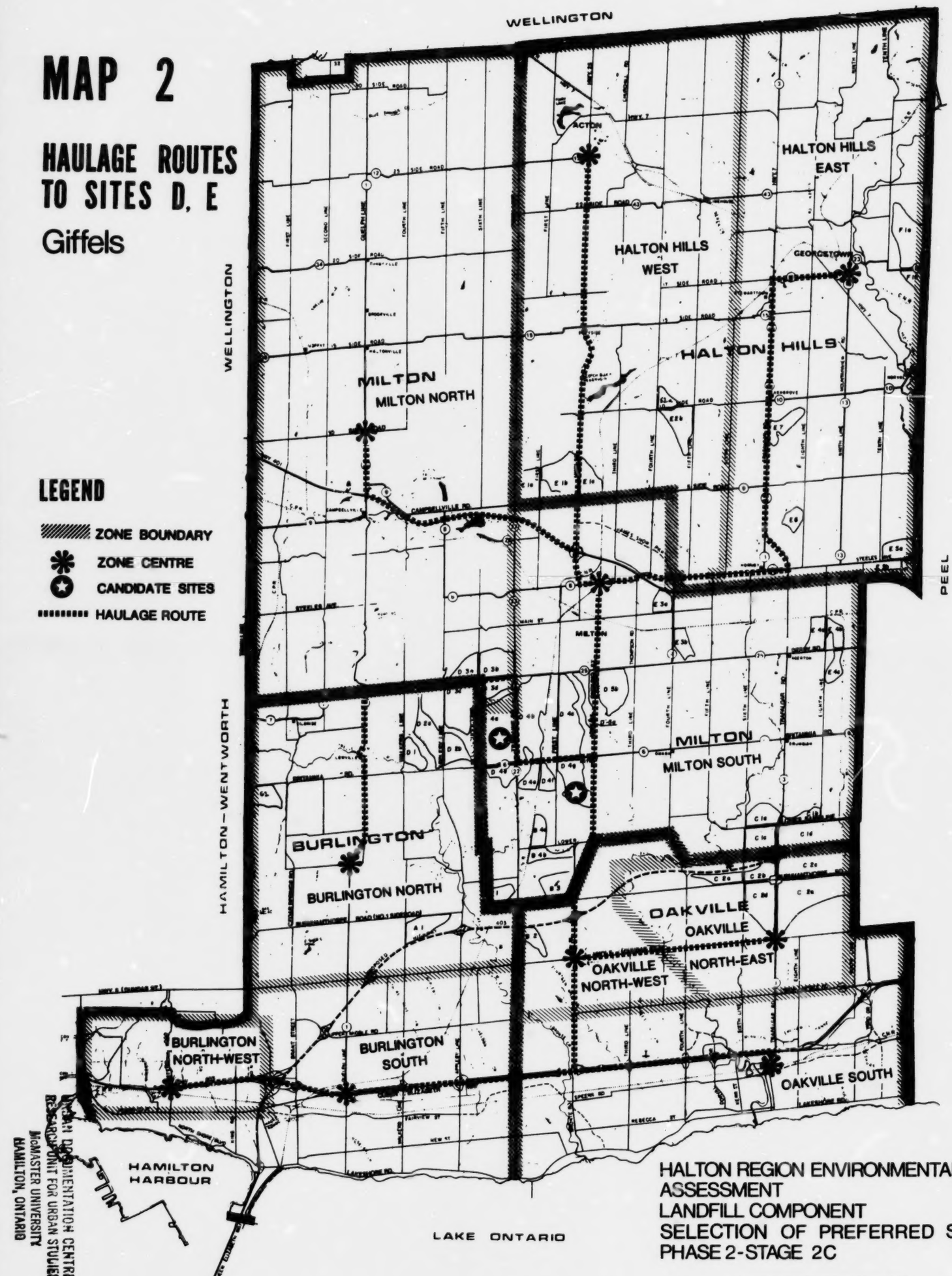
The Regional Municipality of Halton

MAP 2

HAULAGE ROUTES TO SITES D, E

Giffels



LEGEND

- ZONE BOUNDARY
- ZONE CENTRE
- CANDIDATE SITES
- HAULAGE ROUTE

HALTON REGION ENVIRONMENTAL ASSESSMENT
LANDFILL COMPONENT
SELECTION OF PREFERRED SITE
PHASE 2-STAGE 2C

KILOMETRES 0 1 2 3 4 5 6
MILES 0 1 2 3 4

* NOTE: ALIGNMENT OF HIGHWAY No. 403 IS AS SHOWN ON OBM MAPPING.

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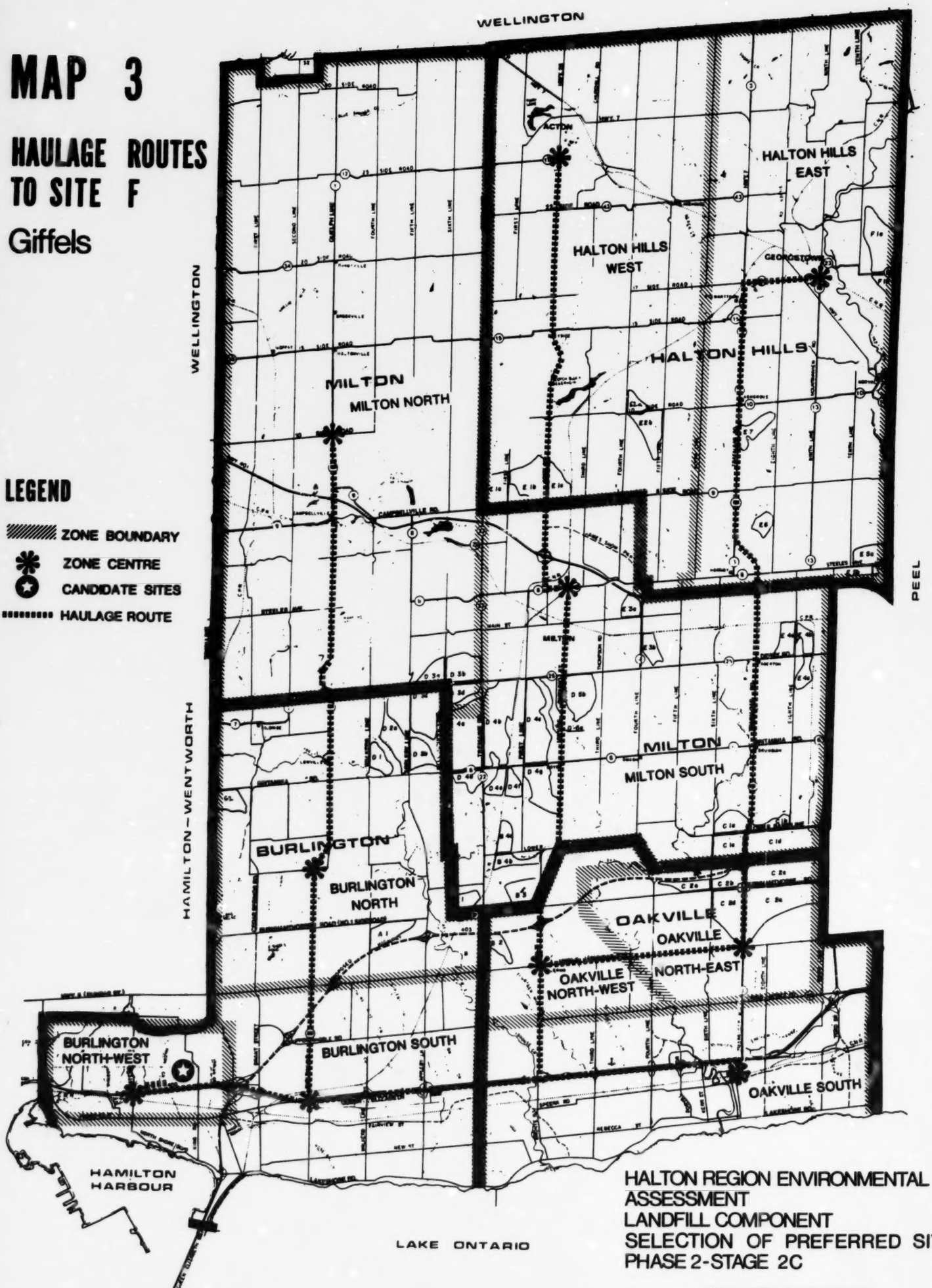
MAP 3

HAULAGE ROUTES TO SITE F

Giffels



LEGEND

- ZONE BOUNDARY
- ZONE CENTRE
- CANDIDATE SITES
- HAULAGE ROUTE

HALTON REGION ENVIRONMENTAL ASSESSMENT
LANDFILL COMPONENT
SELECTION OF PREFERRED SITE
PHASE 2-STAGE 2C

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KILOMETRES
MILES

* NOTE: ALIGNMENT OF HIGHWAY No 403 IS AS SHOWN ON OSM MAPPING.

The Regional Municipality of Halton

3.0 SITE ACCESS REQUIREMENTS

3.1 Introduction

Each Candidate Site and then, Site Plan Area, was investigated for off-site local improvements required to accommodate vehicles delivering refuse for landfill. This comparative assessment of road improvements assumed a standard "T" intersection requirement at each site access location. In addition, necessary road improvements were identified where haulage vehicles required travel along local roads in the vicinity of each Site.

Main "feeder" haulage routes to each Site were considered appropriate for haulage vehicles only if presently constructed to adequate standards. These standards included the follcwing:

- paved surface (7.5 m in width);
- adequate shoulders (2.5 m/.5 m paved);
- sufficient roadbed depth (Regional standards);
- adequate roadbed drainage.

Specific details of road improvements are contained in the Appendix and summarized on Exhibits 1-6.

3.2 Site A

The original site access location for this alternative was located on Burnhamthorpe Road just west of the Ninth Line. However, due to the resultant requirements to upgrade Burnhamthorpe Road east from Trafalgar Road to the site entrance and the land use/social impacts of utilizing this road as the main access to the Site, it was concluded that a more appropriate access location would be directly from Trafalgar Road via a new east-west entrance road that would extend adjacent to (and south of) Highway 403. The access from Trafalgar Road would be situated mid-way between Burnhamthorpe Road and the future south ramp terminal intersection of Trafalgar Road with Highway 403. A 30 m right-of-way will be required for this road. (Refer to Exhibit 1).

The following "external" road improvements have been identified for this site:

Entrance Road (length - 1.6 km)	-	$235,000
Trafalgar Road improvements at entrance	-	$ 60,000

A property requirement of approximately 4.8 ha will be necessary for the access road. The cost of this will be in addition to the above costs.

3.3 Site B

The original site access location for this alternative was on Burnhamthorpe Road. Due to concerns related to utilizing this road as the main access to the Site, it was concluded that a more appropriate access would be directly from Trafalgar Road. (Refer to Exhibit 2.)

The only identified external road improvement associated with this Site is Trafalgar Road widening at the entrance (cost - $60,000).

3.4 Site C

The original access location for this alternative was on Burnhamthorpe Road. As with Sites A and B, due to concerns related to utilizing this road as the main access to the site, it was concluded that a more appropriate access would be directly from Trafalgar Road. (Refer to Exhibit 3).

The only identified external road improvement associated with this alternative is Trafalgar Road widening at the entrance (cost - $60,000).

3.5 Site D

Site D access is directly from Highway 25. The only identified external road improvements associated with this alternative is Highway 25 widening at the site (cost - $75,000). (Refer to Exhibit 4.)

3.6 Site E

Access to Site E if from Tremaine Road. Due to existing road conditions, complete reconstruction of Britannia Road (Highway 25 to Tremaine Road) and Tremaine Road (Britannia Road to just north of the proposed entrance) is recommended along with associated intersection improvements. (Refer to Exhibit 5.)

The total cost of these improvements is estimated at $615,000.

3.7 Site F

Site F access is from the North Service Road at the location of the existing Burlington Landfill entrance. As such, only additional widening of the North Service Road in the immediate area of the entrance was considered warranted. (Refer to Exhibit 6.)

The total cost of this widening is estimated at $60,000.

4.0 TRAFFIC VOLUMES AND ARRIVAL CHARACTERISTICS

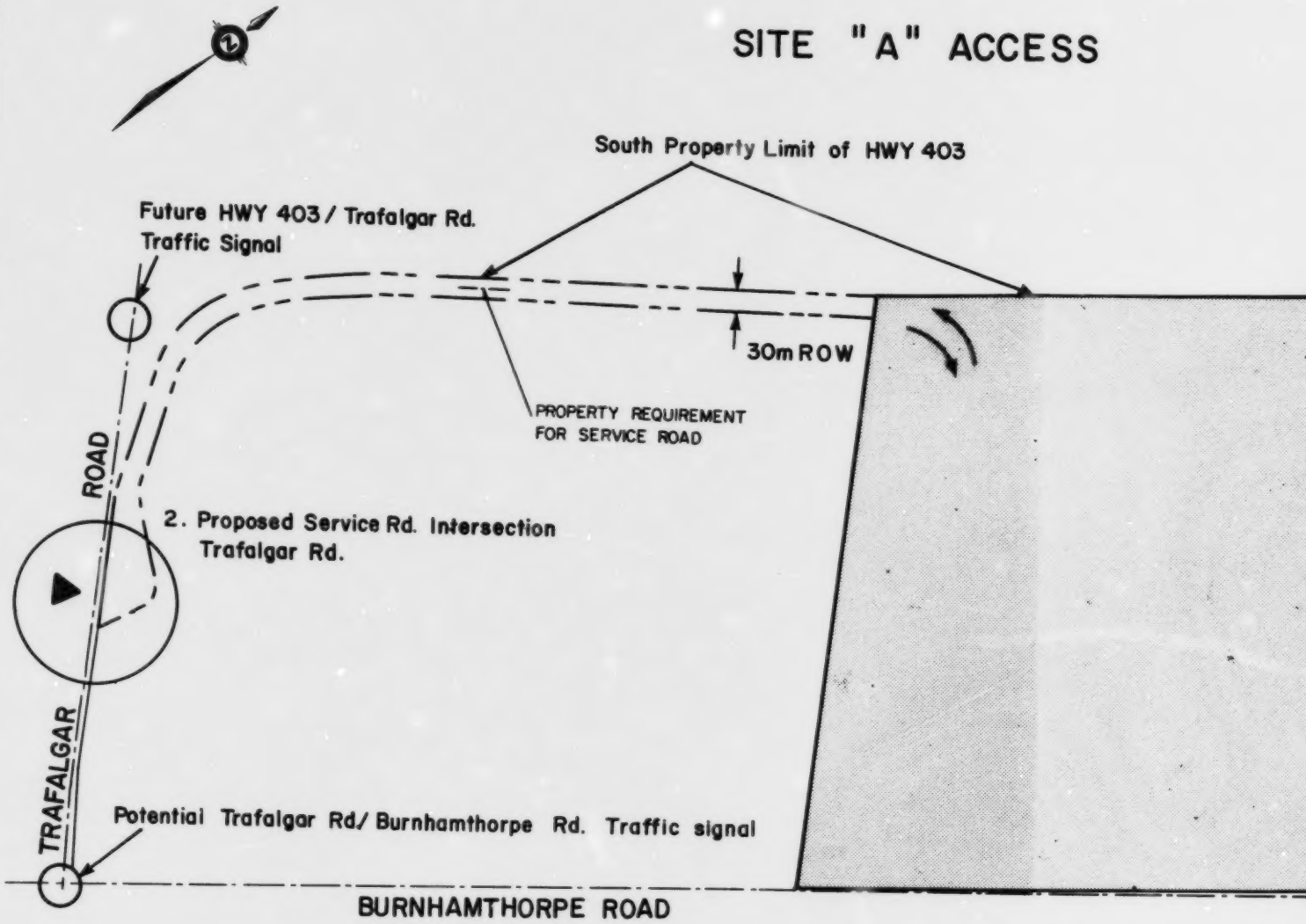
4.1 Introduction

In order to predict relative differences in the traffic impacts among the Candidate Sites, the approximate number of future arrivals to each Site was estimated. The differences in the distribution of these vehicles on the Region's road network were examined to evaluate the relative impacts of each Site.

It should be stressed that only a relative impact assessment was considered appropriate for this stage of the study. The siting of a landfill does not, in itself, generate vehicles hauling refuse. It redistributes these vehicles throughout the available road network. It is this redistribution of haulage vehicles and the related impacts that was used to evaluate transportation differences among the routes. The impact assessment then concentrated on the use of roads considered inappropriate for haulage vehicles. The data presented in this section of the report was derived for this type of assessment.

It was assumed that to each alternative Site, the same numbers of vehicles would be delivering refuse. It was further assumed that the distribution of vehicle types would also be the same to each site (i.e., large trucks, pick-ups/vans, cars with trailers and cars). Therefore, for a comparative assessment of transportation aspects related to haulage, similar arrival characteristics will exist for each Site, differing only in arrival orientation. The assessment of likely haulage traffic volumes and arrival characteristics was carried out to give a general indication of haulage vehicle arrival aspects associated with any of the six Sites and the approximate origin (by waste zone) of these vehicles.

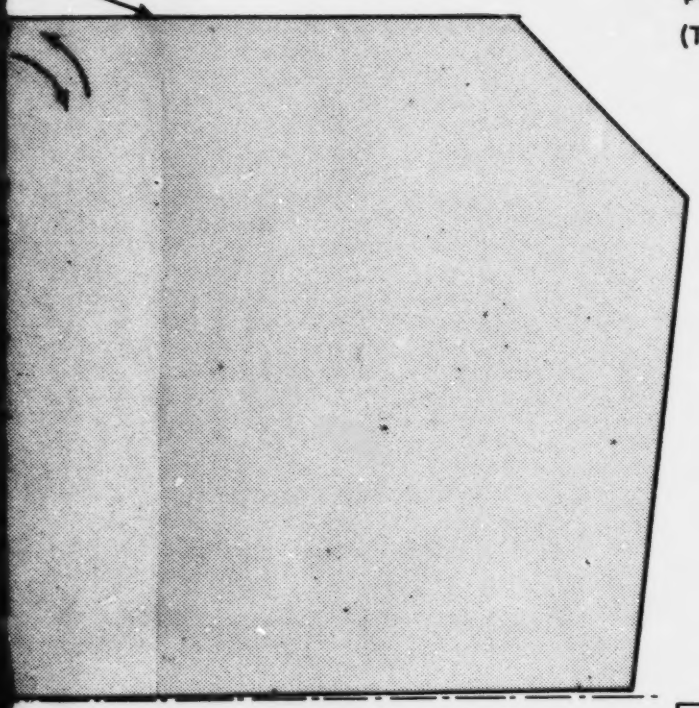
SITE "A" ACCESS



SCALE 1: 10000

ACCESS

403



REQUIRED ROAD IMPROVEMENTS:

1. Construction of Service Road from North-West corner of site along HWY 403, boundary to connect to Trafalgar Rd.

2. Trafalgar Road

- provision for southbound left turn lane at Service Road entrance (Traffic signals may be required - warrants to be determined)

SCALE 1: 10000

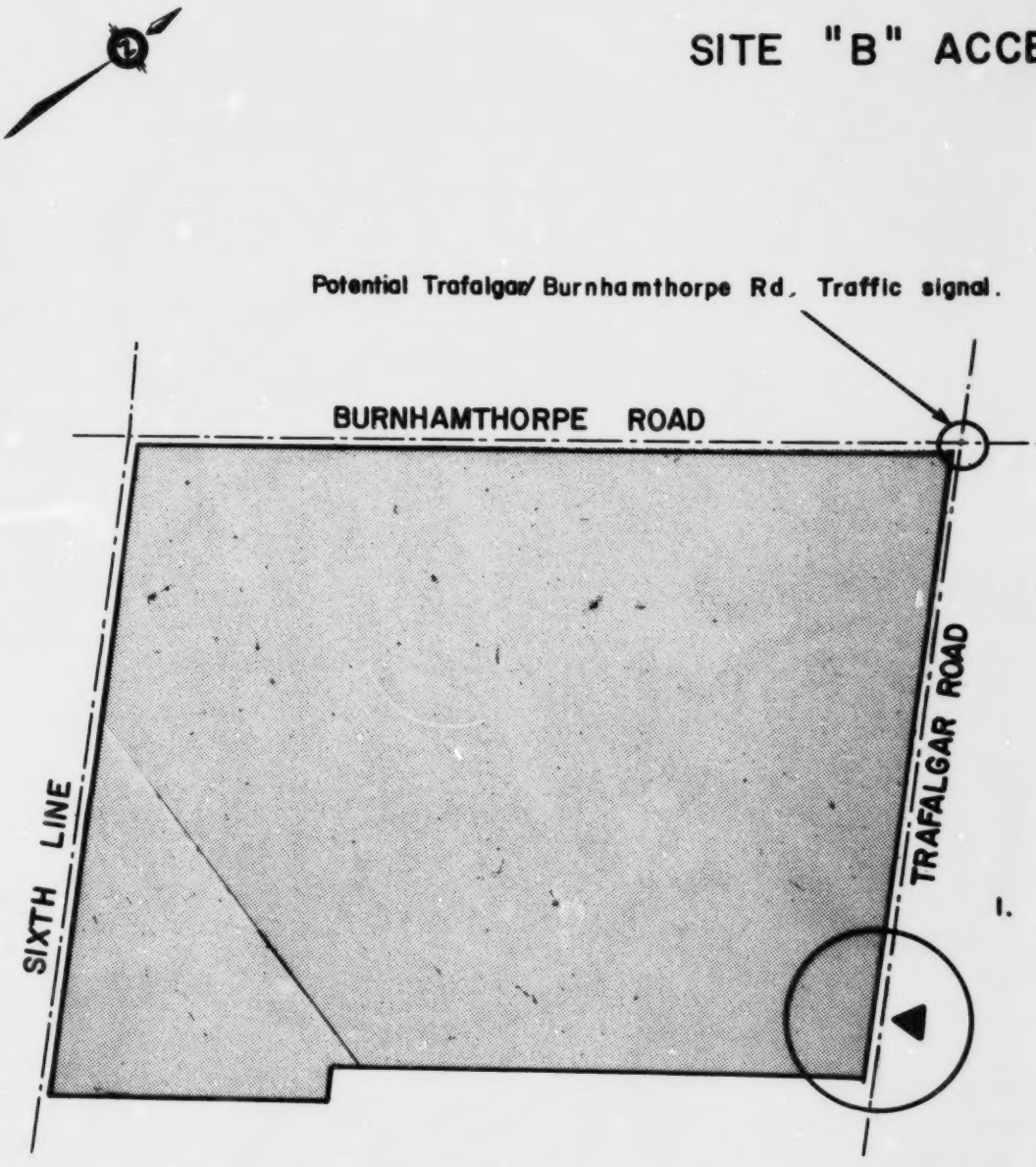
HALTON ENVIRONMENTAL ASSESSMENT
SITE SELECTION

REQUIRED ROAD IMPROVEMENTS

Giffels

EXHIBIT 1

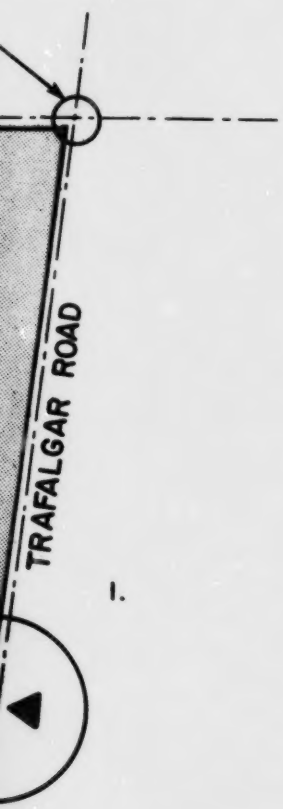
SITE "B" ACCE



SCALE 1:10000

" ACCESS

lc signal.



1.

REQUIRED ROAD IMPROVEMENTS:

1. Widen Trafalgar Road to provide for northbound left hand turns at site entrance
(Traffic signals may be required - warrants to be determined)

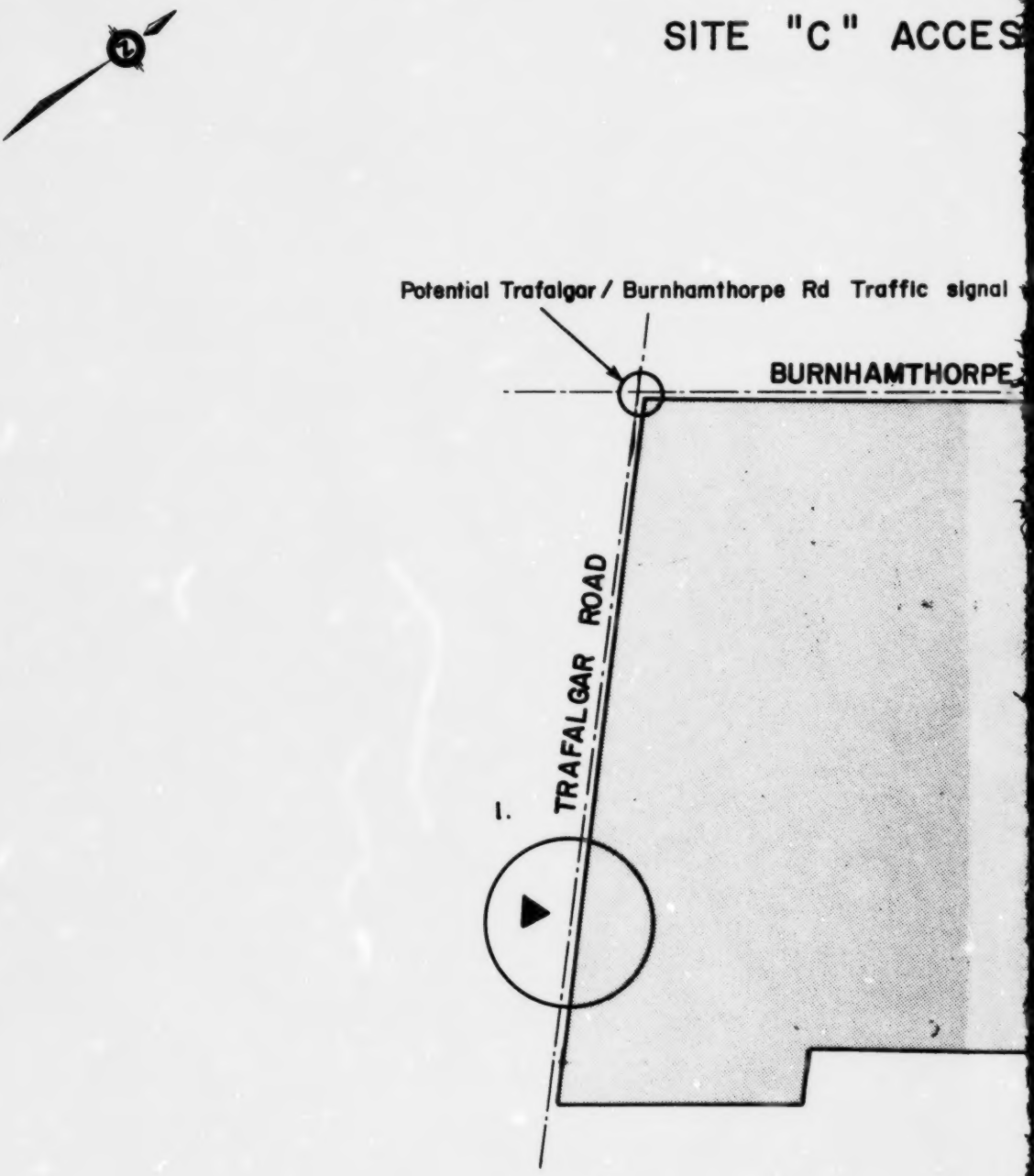
HALTON ENVIRONMENTAL ASSESSMENT
SITE SELECTION

REQUIRED ROAD IMPROVEMENTS

Giffels

EXHIBIT 2

SITE "C" ACCES



SCALE 1: 10000

" ACCESS

REQUIRED ROAD IMPROVEMENTS:

1. Widen Trafalgar Road to provide for southbound left hand turns at site entrance
(Traffic signals may be required - warrants to be determined)

Traffic signal

HAMTHORPE ROAD

E 1: 10000

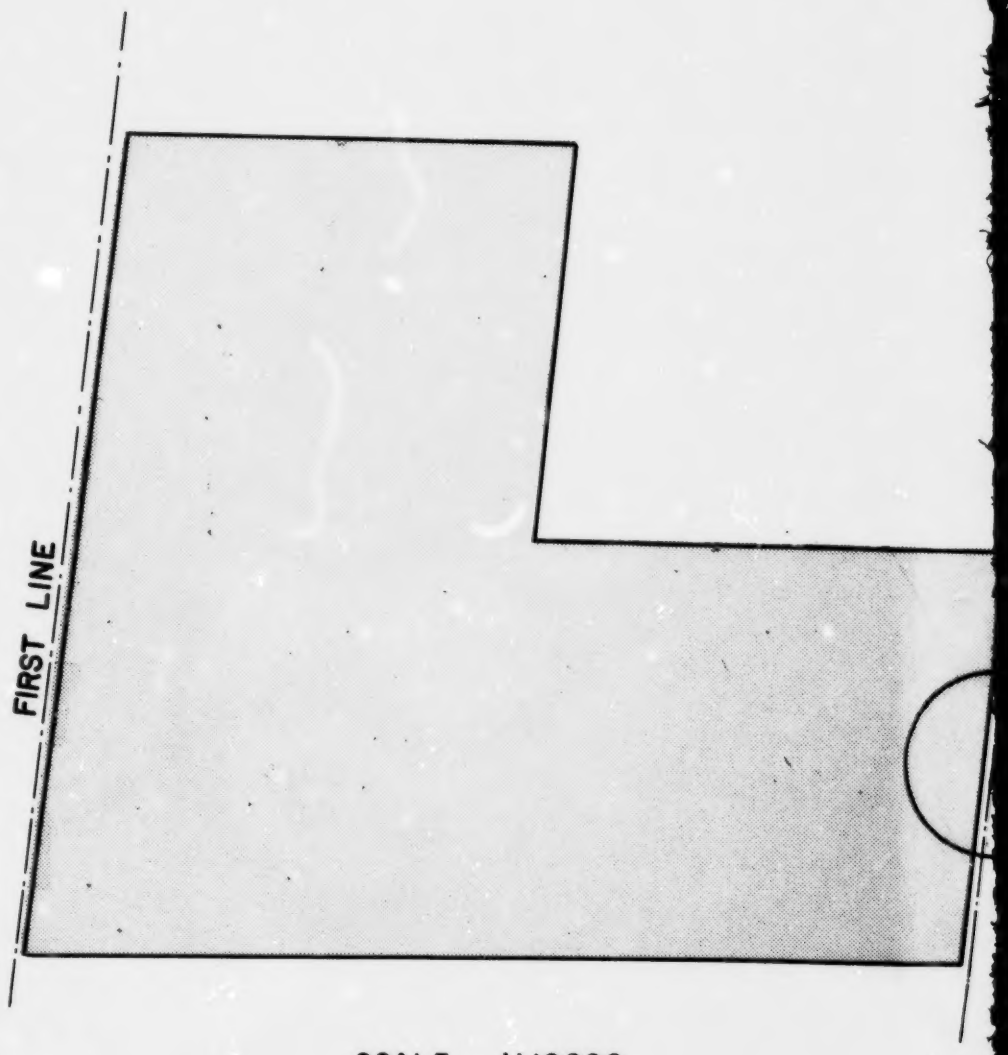
HALTON ENVIRONMENTAL ASSESSMENT
SITE SELECTION

REQUIRED ROAD IMPROVEMENTS

Giffels

EXHIBIT 3

SITE "D" ACCES

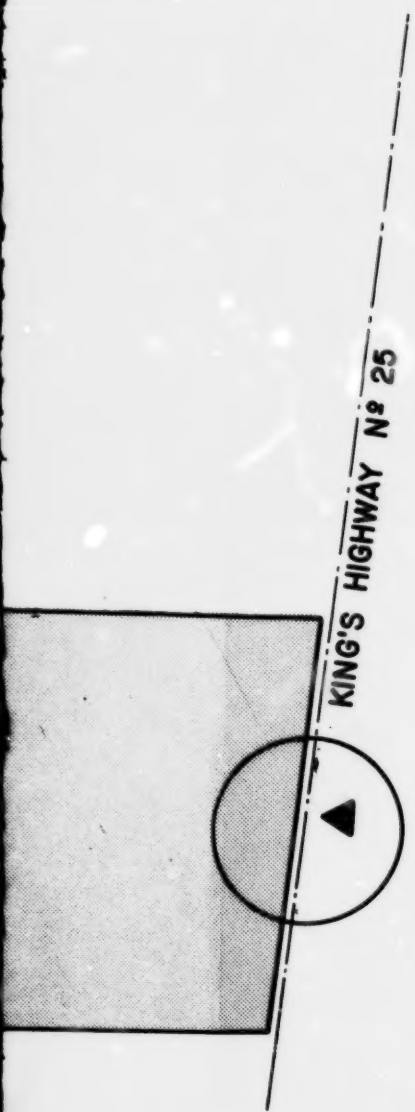


SCALE 1:10000

"D" ACCESS

REQUIRED ROAD IMPROVEMENTS:

Widen HWY 25 to provide for southbound right hand turns and northbound left hand turns at site entrance
(Traffic signals may be required - warrants to be determined)

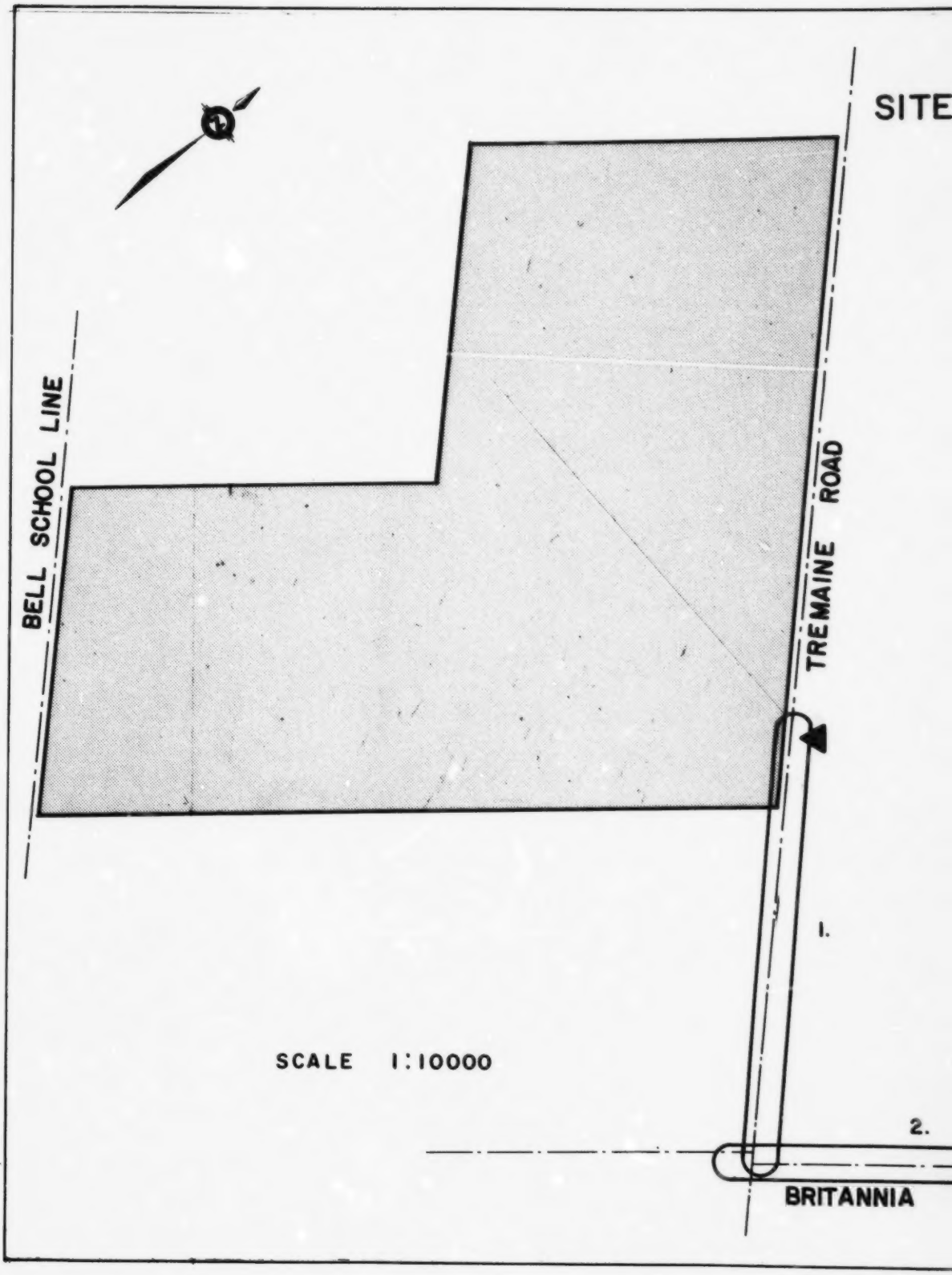


HALTON ENVIRONMENTAL ASSESSMENT
SITE SELECTION

REQUIRED ROAD IMPROVEMENTS

Giffels

EXHIBIT 4


SITE
BELL SCHOOL LINE
TREMAINE ROAD
SCALE 1:10000
2.
BRITANNIA

SITE "E" ACCESS

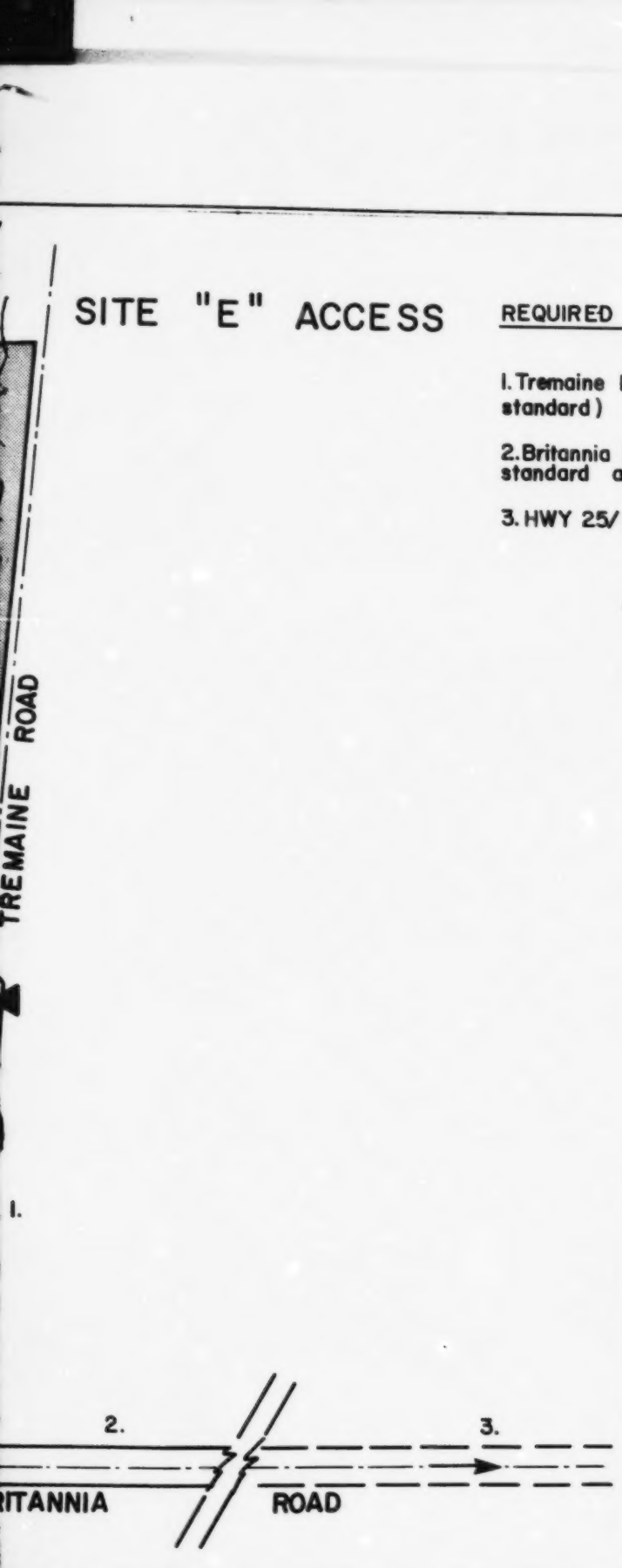
REQUIRED ROAD IMPROVEMENTS:

1. Tremaine Road: Britannia Rd. to site entrance (road reconstruction to improved standard)

2. Britannia Rd: HWY 25 to Tremaine Rd. (road reconstruction to improved standard and re-alignment at Tremaine Rd. intersection)

3. HWY 25/ Britannia Rd. intersection

- widen to provide for northbound left hand turns
- installation of traffic signals may be required (warrants to be determined)

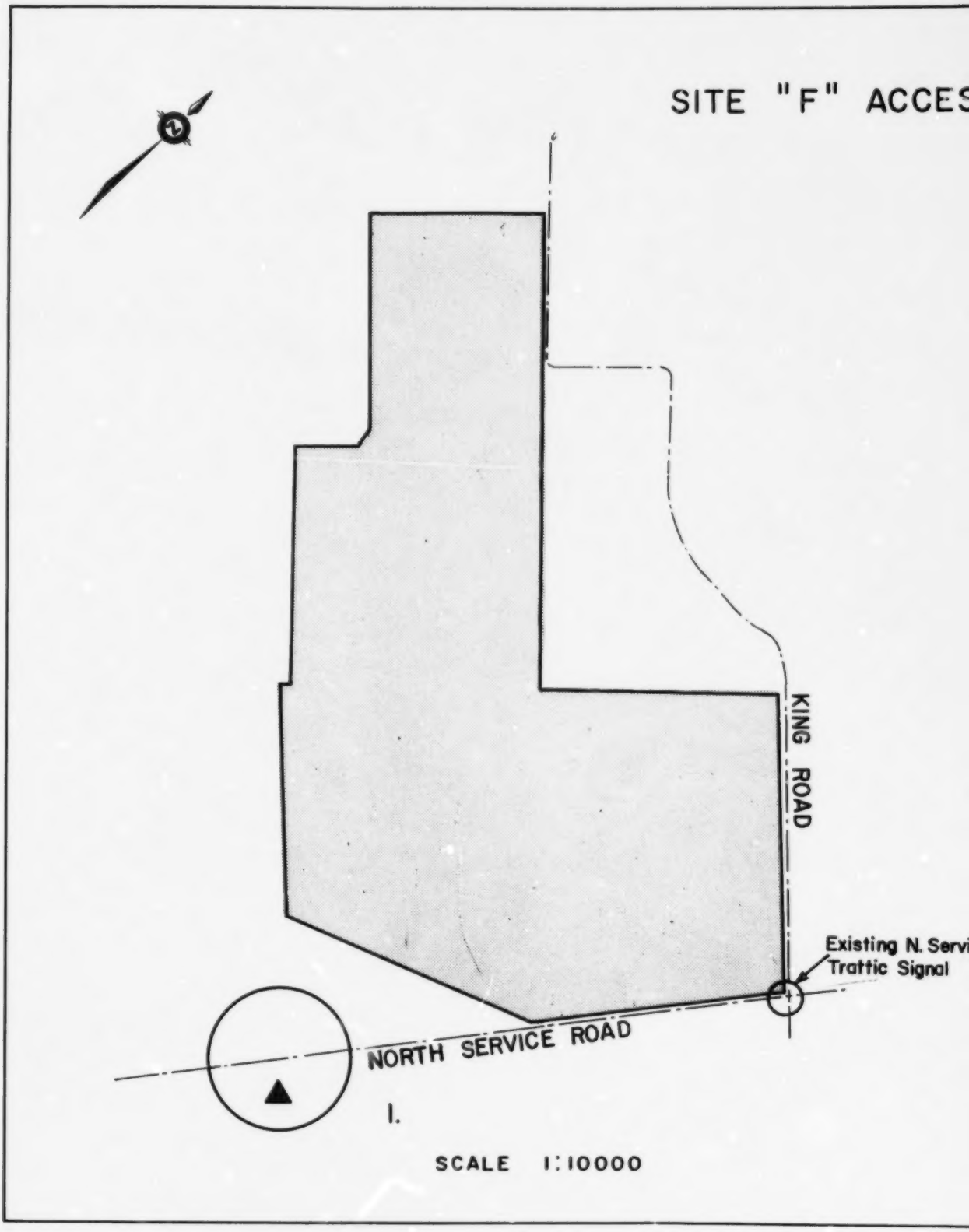


HALTON ENVIRONMENTAL ASSESSMENT
SITE SELECTION

REQUIRED ROAD IMPROVEMENTS

Giffels

EXHIBIT 5

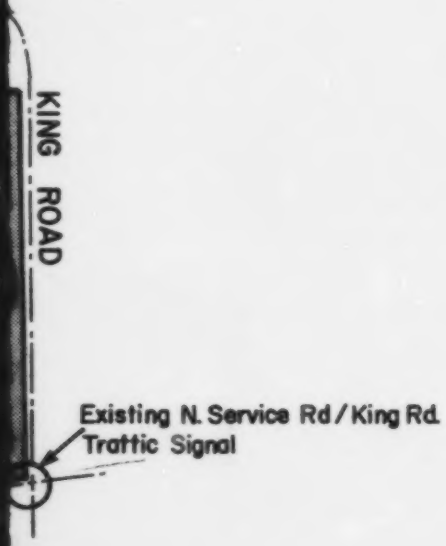

SITE "F" ACCES
KING ROAD
Existing N. Servi
Trattic Signal
NORTH SERVICE ROAD
SCALE 1:10000

"F" ACCESS

REQUIRED ROAD IMPROVEMENTS:

1. Widen N. Service Road to provide for eastbound left hand turns at site entrance

(Traffic signals may be required - warrants to be determined)



HALTON ENVIRONMENTAL ASSESSMENT
SITE SELECTION

REQUIRED ROAD IMPROVEMENTS

Giffels

EXHIBIT 6

TABLE 1

1983 Arrival Statistics - Burlington Landfill Site

Weekday Arrivals - By Vehicle Classification

Month	Delivery Days	Large Trucks	P/U Trucks & Vans	Cars With Trailers	Cars	Total
January	21	2,593	1,241	74	346	4,254
February	20	2,267	1,061	67	263	3,658
March	23	2,637	1,516	161	421	4,735
April	21	2,657	2,046	259	681	5,643
May	22	3,251	2,576	128	877	6,832
June	22	3,003	2,834	229	1,215	7,281
July	21	2,564	2,878	190	1,453	7,085
August	23	2,807	2,776	184	1,487	7,254
September	22	2,603	2,383	154	1,068	6,208
October	21	2,537	2,133	207	826	5,703
November	22	2,652	2,015	107	603	5,377
December	22	2,313	1,336	68	642	4,359
TOTAL	260	31,884	24,795	1,828	9,882	68,389

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4.2 Existing Arrival and Weight Statistics - Burlington Landfill Site

The last complete year of records for the operation of the existing Burlington Landfill Site was used as the basis of assessing arrival characteristics (January through December, 1983). Weekday and Saturday statistics have been summarized separately due to the different nature of arrivals for these two periods.

Tables 1 through 5 summarize the findings.

Table 1 indicates the monthly distribution of the following types of vehicles delivering waste to the Burlington landfill (for weekdays only):

- Large Trucks;
- Pick-Up Trucks and Vans;
- Cars with Trailers;
- Cars without Trailers.

Table 2 summarizes the same information for Saturdays. The period from May to August contains the peak weekday deliveries (42% of total arrivals) with the month of June being the highest single month. On Saturdays, the highest noted month was July with a significant drop in arrivals in the winter months (January, February, March, December).

Utilizing the yearly totals, in 1983 the following was the distribution in the types of vehicles arriving at the Burlington Landfill Site:

	Weekdays	Saturdays
Large Trucks	47%	7%
Pick-Ups/Vans	36%	41%
Cars with Trailers	3%	14%
Cars	14%	38%
Total	100%	100%

Table 3 summarizes the average number of vehicles arriving per day for weekdays and Saturdays summarized by month during 1983. The months of May

TABLE 2

1983 Arrival Statistics - Burlington Landfill Site

Saturday Arrivals - By Vehicle Classification

Month	Delivery Days	Large Trucks	P/U Trucks & Vans	Cars With Trailers	Cars	Total
January	4	52	293	42	218	605
February	4	62	299	42	182	585
March	4	77	367	92	287	823
April	5	136	957	310	580	1,983
May	4	165	852	302	557	1,876
June	4	110	736	267	731	1,844
July	5	135	750	299	843	2,027
August	4	89	589	248	655	1,581
September	4	109	422	216	588	1,335
October	5	129	837	322	716	2,004
November	4	91	492	207	499	1,289
December	5	112	342	65	546	1,065
TOTAL	52	1,267	6,936	2,412	6,402	17,017

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TABLE 3

1983 Arrival Statistics - Burlington Landfill Site

Average Vehicle Arrivals Per Day

Month	Weekday	Saturday
January	203	151
February	183	146
March	206	206
April	269	397
May	311	469
June	331	461
July	337	405
August	315	395
September	282	334
October	272	401
November	244	322
December	198	213

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TABLE 4

1983 Weight Statistics (Tonnes) - Burlington Landfill Site

Weekdays and Saturdays

Month	Total Weight	Total Weekday		Total Saturday	
		Weight	Days	Weight	Days
January	11,169	10,922	21	247	4
February	10,275	10,037	20	238	4
March	12,546	12,279	23	267	4
April	13,129	12,437	21	692	5
May	18,278	17,467	22	811	4
June	16,689	16,215	22	474	4
July	13,520	12,956	21	564	5
August	15,577	15,084	23	493	4
September	14,699	14,225	22	474	4
October	14,262	13,625	21	637	5
November	15,102	14,588	22	514	4
December	12,085	11,616	22	469	5
TOTAL	167,331	161,451	260	5,880	52

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TABLE 5

1983 Weight Statistics (Tonnes) - Burlington Landfill Site

Average for Weekdays and Saturdays

Month	Weekday	Saturday
January	520	62
February	502	60
March	534	67
April	592	138
May	794	203
June	737	119
July	617	113
August	656	123
September	647	119
October	649	127
November	663	129
December	528	94

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through August generally contain the highest average daily arrivals and there is a considerable variance in average arrivals throughout the year on both weekdays and Saturdays.

Table 4 summarizes the total recorded weight processed at the Burlington Landfill Site in 1983, summarized by month. The same general trends of summer peaks and considerable monthly variance are evident.

Table 5 indicates weekday and Saturday delivery weight averages.

4.3 Vehicle Arrival Projections - 1988, 1996 & 2008

Table 6 contains the weight of refuse to be delivered directly to the landfill site for the years 1988, 1996 and 2008. Not included in these totals is landfill "bound" waste from any energy from waste (EFW) facilities that may be in place in the Region in 2008.

Utilizing the same vehicle/weight relationships observed during 1983, Tables 7 and 8 were developed. These tables show approximate haulage vehicle distributions in the Region. These numbers were developed assuming that each waste zone would exhibit identical haulage characteristics (vehicle/weight relationship, yearly distribution). For each year, the "average" weekday and Saturday numbers reflect a time of year condition corresponding to the highest delivery periods. For this reason, they are considered to represent a "design condition" that would represent a high or critical day to be used for impact assessment. As can be seen from these tables, considerable variance exists in the numbers of vehicles generated by each waste zone.

Table 6

Waste Distribution by Zone (Landfill Component)*

(Tonnes)

Waste Zone	1988 (7 months) Weight	%	1996 (12 months) Weight	%	2008 (5 months) Weight	%
Burlington						
North-West	2,298	2%	4,180	2%	1,010	1%
South	52,041	39%	95,337	36%	27,669	36%
North	1,351	1%	2,612	1%	855	1%
Oakville						
South	49,878	37%	96,121	37%	27,280	35%
North-West	270	<1%	522	<1%	621	1%
North-East	3,244	2%	11,754	4%	5,285	7%
Milton						
South	7,975	6%	14,365	6%	4,042	5%
North	1,622	1%	3,135	1%	932	1%
Halton Hills						
East	11,895	9%	24,814	10%	7,849	10%
West	4,596	3%	8,358	3%	2,176	3%
TOTAL	135,170	100%	261,198	100%	77,719	100%

(*) Source: C.N. Watson - December 1984

Table 7

Number of Haulage Vehicle Trips Per Day (Design Condition)*

Average Weekday - One Way

Source Waste Zone	1988	1996	2008
Burlington			
North-West	9	10	4
South	171	187	133
North	4	5	4
Oakville			
South	163	192	129
North-West	1	1	3
North-East	9	21	26
Milton			
South	26	31	19
North	4	5	4
Halton Hills			
East	40	52	37
West	13	16	11
TOTAL ARRIVALS	440	520	370

(*) Approximate Only - for comparative assessment of alternative sites.

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Table 8

Number of Haulage Vehicle Trips Per Day (Design Condition)*

Average Saturday - One Way

Source Waste Zone	1988	1996	2008
Burlington			
North-West	12	14	6
South	237	258	201
North	6	7	6
Oakville			
South	226	267	195
North-West	1	1	5
North-East	13	29	39
Milton			
South	36	43	29
North	6	7	6
Halton Hills			
East	55	72	56
West	18	22	17
TOTAL	610	720	560

(*) Approximate Only - for comparative assessment of alternative sites.

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5.0 TRAVEL TIMES AND DISTANCES

5.1 Introduction

Travel times and distances were calculated along each of the haulage routes. Travel times were determined based on representative travel speeds for haulage vehicles assuming appropriate off-peak traffic conditions. The following travel speeds were applied:

1)	Major Provincial highway	90 km/hr
2)	Provincial highways	60-70 km/hr
3)	Arterials, concession roads	30-60 km/hr

Tables 9 and 10 illustrate the resultant travel times and distances to each Site from each waste zone.

5.2 Service and Operations Index

In order to obtain an indication of driver convenience, a "Service and Operations Index" was developed to describe, in general terms, the relative driver service potential to each Site.

Initially, total vehicle time (minutes x number of vehicles) and distance (distance x number of vehicles) figures were determined for each Site based on the average number of haul trips on a weekday for the years 1988, 1996, and 2008. The results are summarized in Tables 11 and 12 respectively.

By utilizing this data, an appropriate time and distance index was then calculated for each Site. The results are outlined in Table 13 and summarized in the following discussion. No significant differences were identified.

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McMASTER UNIVERSITY
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A time and distance index of 1.00 was designated for Sites A, B, and C for each analysis year since these sites provided the best overall driver service potential. The results are identical for these sites since the Regional travel model assumes a common end point for haulage trips.

The time and distance index for Site D was slightly higher for each analysis year. This difference was influenced mainly by the increased haulage distances and travel times for drivers from the Oakville area.

Site E had a time index that ranged from 1.33 to 1.38 and a distance index between 1.36 and 1.38. These figures indicated that driver service potential was least, overall, for Site E, influenced mainly by the increased haulage times and distances from both the Oakville and Burlington areas.

Similarly, Site F had higher total haulage times and distances. The time index ranged from 1.20 to 1.24 while the distance index varied between 1.34 and 1.40. The lower time index values reflected the high proportion of freeway travel to Site F that resulted in overall reduction of travel times.

The following ranking can be applied to general driver convenience based on a combined assessment of the time and distance index for each Candidate Site.

Rank	Site
1	A,B,C
4	D
5	F
6	E

Table 9

Time (minutes) From Zone Centroids to Sites
1988 Road System
(1996/2008 Routes Shown in Brackets Where Applicable)

ZONE	A,B,C	D	E	F
1	22.3 (17.55)	19.21 (15.39)	22.98 (19.16)	1.75
2	17.76 (16.84)	14.68	18.45	6.28
3	18.94 (15.70)	16.71	12.94	15.4 (12.17)
4	8.23 (7.30)	5.14	8.91	15.82 (14.57)
5	9.24	15.94	19.71	18.62
6	1.89	11.49	15.26	22.16 (20.91)
7	14.87	7.49	8.69	28.45 (24.63)
8	22.21	17.48	18.68	29.55 (26.31)
9	27.25	22.52	23.72	43.48 (39.66)
10	21.57	25.54	26.74	45.62 (39.50)

Source: Region of Halton

Table 10

Distance (km) From Zone Centroids to Sites
1988 Road System
(1996/2008 Routes Shown in Brackets Where Applicable)

ZONE	A,B,C		D		E		F	
1	28.7	(26.1)	25.1	(21.8)	29.5	(26.2)	1.7	
2	21.9	(22.6)	18.3		22.7		8.5	
3	22.1	(21.9)	19.5		15.1		16.8	(15.9)
4	9.6	(10.3)	6.0		10.4		20.8	(20.5)
5	7.2		18.4		22.8		25.2	
6	2.2		13.4		17.8		28.2	(27.9)
7	18.3		7.7		9.1		34.5	(31.2)
8	29.6		20.2		21.6		33.3	(32.4)
9	33.3		23.9		25.3		50.7	(47.4)
10	24.7		28.3		29.7		55.1	(50.9)

Source: Region of Halton

Table 11

Service & Operations

Total Vehicle - Minutes *

TO SITE	FROM	YEAR 1988	1996	2008
A,B,C	Burlington	3,314	3,402	2,373
	Oakville	1,531	1,821	1,263
	Milton	476	572	372
	Halton Hills	1,217	1,558	1,098
	TOTAL	6,358	7,353	5,106
D	Burlington	2,750	2,983	2,081
	Oakville	2,706	3,306	2,370
	Milton	265	319	212
	Halton Hills	1,315	1,688	1,193
	TOTAL	7,036	8,296	5,856
E	Burlington	3,414	3,707	2,583
	Oakville	3,359	4,113	2,967
	Milton	301	362	240
	Halton Hills	1,378	1,770	1,250
	TOTAL	8,452	9,952	7,040
F	Burlington	1,152	1,252	891
	Oakville	3,250	4,029	2,990
	Milton	858	896	573
	Halton Hills	2,390	2,689	1,897
	TOTAL	7,650	8,866	6,351

(*) Sum of Travel Times X Average Number of Vehicles on Weekday (refer to Table 7).

Table 12

Service & Operations

Total Vehicles - Kilometre *

TO SITE	FROM	YEAR 1988	1996	2008
A,B,C	Burlington	4,091	4,596	3,198
	Oakville	1,204	1,438	1,017
	Milton	594	715	466
	Halton Hills	1,421	1,817	1,280
	TOTAL	7,310	8,566	5,961
D	Burlington	3,433	3,737	2,599
	Oakville	3,126	3,820	2,740
	Milton	281	340	227
	Halton Hills	1,443	1,854	1,310
	TOTAL	8,283	9,751	6,876
E	Burlington	4,027	4,582	3,184
	Oakville	3,886	4,762	3,435
	Milton	323	390	259
	Halton Hills	1,517	1,949	1,377
	TOTAL	9,933	11,683	8,255
F	Burlington	1,535	1,685	1,201
	Oakville	4,383	5,444	4,037
	Milton	1,030	1,129	723
	Halton Hills	2,863	3,405	2,404
	TOTAL	9,811	11,663	8,365

(*) Sum of Travel Distances X Average Number of Vehicles on Weekday (refer to Table 7).

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Table 13

Service & Operations Index *

	YEAR		
	1988	1996	2008
SITES A,B,C			
Time Index	1.00	1.00	1.00
Distance Index	1.00	1.00	1.00
SITE D			
Time Index	1.11	1.13	1.15
Distance Index	1.13	1.14	1.15
SITE E			
Time Index	1.33	1.35	1.38
Distance Index	1.36	1.36	1.38
SITE F			
Time Index	1.20	1.21	1.24
Distance Index	1.34	1.36	1.40

(*) Based on Total Regional Vehicle-Minutes and Vehicle-Distance Data. (Refer to Tables 11 & 12)

6.0 IMPACTS AND EVALUATION

6.1 Introduction

As indicated previously, the transportation component of this assessment considered two basic evaluation factors:

- Traffic Safety;
- Traffic Service and Operations.

Traffic Safety relates primarily to the safe operation of both haulage traffic and other road users on routes identified as transporting haulage vehicles. Since public safety is a prime concern, mitigation measures have been incorporated into each Site, relative to access, which should ensure safe operation on the main "feeder" route to each Site. This necessitated the following general mitigating measures:

- proper location of the site entrance (to avoid/minimize conflicts with local road traffic and other road users);
- road widenings at site entrances to minimize conflicts with through vehicles;
- general improvements (where appropriate) to upgrade road standards to make critical road links suitable for both haulage vehicles and local traffic.

In general, satisfactory access locations have been identified for most Sites from roads considered appropriate for haulage (Highway 25, Trafalgar Road, North Service Road). Therefore, with the recommended entrance treatments on these roads with Sites A, B, C, D and F, these roads should continue to function in a safe manner for both haulage, local and other road users. No specific concerns have been identified with respect to Traffic Safety aspects related to these Sites. Therefore, Traffic Safety differences among the Sites related to haulage are not considered significant.

Only with Site E, which utilizes local roads as the main access, are there potential conflicts with local traffic. However, due to the low volumes of traffic on Britannia and Tremaine Roads and the infrequency of entrances along these roads (Refer to Appendix 5), potential traffic conflicts with haulage vehicles should be relatively low.

An additional aspect related to Traffic Safety is the general distribution of haulage vehicles throughout the Region associated with each Site. Trips from certain specific waste zones may, for portions of the route to the landfill site, require travel along road links not considered appropriate for haulage vehicles. These have been identified for each alternative Site (Refer to Section 6.2).

Traffic Service and Operations relates to the service, provided to, and the operational characteristics of, haulage. The assessment identified two main aspects of site performance:

1) Quality of Main Feeder Routes

   (i.e., relatively high speed or high standard arterials, involving fewer stops or turns through intersections, will provide a higher level of service for the haulage of waste);

2) Service and Operations Index

   (i.e., relative indication of potential driver convenience).

As was the case for Traffic Safety, in general, a relatively high level of service has been ensured for most Sites due to the quality of the main 'feeder' routes to each one. Where appropriate, differences have been noted. However, this transportation factor is not related to Public Health and Safety considerations and therefore its relative weight in the overall evaluation is not as high as the Traffic Service Factor.

6.2 Site A

The following is a summary of the main transportation aspects associated with Site A:

Traffic Safety

- Some potential conflict with local traffic due to the use of Trafalgar Road as the main "feeder" route to this Site (Trafalgar Road is the main access into Oakville for both local and general traffic from the north).
- No safety concerns identified at the entrance to the Site.
- Requires minimal use of local roads for main access.
- In the future, the majority of Burlington haulage vehicles can use Highway 403, eliminating travel on Trafalgar Road between Dundas Street and the Site.
- There are no identified concerns related to using road links considered inappropriate for haulage vehicles travelling between the waste zones and the Site.

Traffic Service and Operations

- Trafalgar Road is generally appropriate for the main access route to the Site due to the road standard and classification.
- Good access from majority of Region.
- Minimal use of local roads.
- No operating concerns identified at the entrance to the Site.
- In the future, the majority of Burlington haulage vehicles can use Highway 403 as a high speed, high standard route to within close proximity of the Site.

6.3 Site B

The same comments as for Site A. Its greater distance from Highway 403 will lessen, to a minor extent, the advantage of this future facility (relative to Site A).

6.4 Site C

The same comments as for Site B.

6.5 Site D

The following is a summary of the main transportation aspects associated with Site D:

Traffic Safety

- Requires minimal use of local roads for main access.
- No safety concerns identified at the entrance to the Site.
- Some potential conflict with local traffic in Milton's urban area (from Halton Hills and Milton North waste zones).

Traffic Service and Operations

- Requires travel through the Milton urban area for trips from Halton Hills and Milton North waste zones.
- Good access from majority of Region.
- Minimal use of local roads for main access.
- No operations concerns identified at the entrance to the Site.
- Difficult access from Burlington North waste zone (low number of trips affected).

6.6 Site E

The following is a summary of the main transportation aspects associated with Site E:

Traffic Safety

- Considerable use of local roads (Britannia, Tremaine) resulting in potential conflict with local traffic.
- Requires truck turning at local road intersections.
- Requires haulage vehicles crossing railway at-grade.
- Some potential conflict with local traffic in Milton's urban area (from Halton Hills and Milton North waste zones).

- No safety concerns identified at entrance to Site.

Traffic Service and Operations

- Requires travel through the Milton urban area for trips from Halton Hills and Milton North waste zones.
- Fair access from majority of Region.
- Requires use of local roads.
- No operations concerns identified at the entrance to the site.
- Difficult access from Burlington North waste zone (low number of trips affected).

6.7 Site F

The following is a summary of the main transportation aspects associated with Site F:

Traffic Safety

- Majority of access via Provincial Highways.
- Minimal use of local roads.
- No safety concerns identified at entrance.
- Some potential conflict with local traffic in Milton's urban area for trips from Halton Hills West waste zone.
- Use of Guelph Line is required from Milton North resulting in potential conflicts with local traffic (low number of trips affected).
- Maintains general existing haulage truck routing, creating the least amount of change to existing conditions.

Traffic Service and Operations

- Majority of access via Provincial Highways.
- Fair access from majority of Region.
- Minimal use of local roads.

- No operations concerns identified at the entrance to the Site.
- Requires use of lower standard road (Guelph Line) for trips from Milton North waste zone (low number of trips affected).
- Requires travel through the Milton urban area for trips from Halton Hills West waste zone.

6.8 General Mitigation Aspects

Typical mitigation measures to reduce negative transportation impacts related to the haulage of waste include the following:

1. Appropriate location of landfill entrance.
2. Improve road geometry (horizontal and vertical alignments) to acceptable standards.
3. Intersection improvements (e.g., lane additions, channelization, signalization, illumination) to accommodate truck traffic.
4. Improve road surface (e.g., pave existing gravel roads).
5. Improve road cross-section (e.g., road widening, shoulder widening).
6. Specify reduced speed limits in potential conflict areas.
7. Designation of haulage routes.
8. Use of transfer stations to reduce vehicle arrivals at landfill site.
9. Use of container stations to reduce vehicle arrivals at landfill site.

Where potential traffic safety concerns have been identified, mitigation measures have been incorporated into the conceptual design for the Site Plan Area wherever possible. For example, with Sites A, B, C and D, originally contemplated site entrance locations were modified to remove them from local roads. Intersection improvements have been recommended at all Site Plan Area entrances to accommodate haulage traffic and to minimize conflicts with 'through' traffic. Road reconstruction is proposed with Site E to minimize conflicts and to make local roads more appropriate for haulage vehicles.

As a result, no major concerns have been identified in the operation of any of the six Sites related to general traffic safety. Therefore, no additional mitigation is proposed (or considered necessary) with respect to traffic safety. However, the overall level of impact associated with the transportation of waste within the Region would be affected with the adoption of certain specific mitigation measures such as the use of transfer and container stations. Use of these stations would influence haulage characteristics by generally reducing the number of haulage vehicles on the Region's road network. This would pertain equally to all sites.

For haulage economics it has been recommended to continue the operation of the Georgetown transfer station if a landfill were to be located at site F. This would reduce the number of potential haulage vehicles from the Halton Hills area and will tend to relocate haulage trips from Highway 25 (and the Milton urban area) to Trafalgar Road.

Use of container stations would generally reduce the number of smaller vehicle trips to the landfill Sites. The adoption of such facilities (e.g., one for each area municipality) would not affect the assessment or relative ranking of the six sites presented in this report. The general result would be to lower the overall level of impact along the main haulage routes associated with all sites.

6.9 Summary of Evaluation

Essentially, all Sites are considered acceptable from a transportation standpoint; the differences with respect to Traffic Safety and Traffic Service/Operations are not significant. A ranking with respect to both of these factors (most preferred to least preferred) is summarized below:

Rank	Site
1	D/F
3	A
4	B/C
6	E

APPENDIX A

Preliminary Cost Estimates for Road Improvements

Giffels

Inter-office

DATE: December 11, 1984

TO: Project File W825904

FROM: D.R. Ivany

RE: Halton Environmental Assessment
Landfill Component
Stage 2C
Transportation Analysis
Giffels' Project No. W825904

Preliminary Cost Estimates for Road Improvements

SUMMARY

Site A	$295,000.	1. New Service Road -	$235,000.
		2. Trafalgar Road -	$ 60,000.
Site B	$ 60,000.		
Site C	$ 60,000.		
Site D	$ 75,000.		
Site E	$615,000.	1. Tremaine Road -	$120,000.
		2. Britannia Road -	$420,000.
		3. Highway 25 -	$ 75,000.
Site F	$ 60,000.		

SITE A			$ Amount
1.	Service Road Construction - 1.6 km		
	a) Excavation: 4,800 m^3 @ \$3.00/m^3	=	\$ 14,400.
	b) Sub-Base: Supply & place Granular B 14,400 Tonnes @ \$4.50/T	=	\$ 64,800.
	c) Base: 150 mm Asphalt 8,064 Tonnes @ \$6.00/T	=	\$ 48,384.
	d) Pavement: 150 mm Asphalt 2,940 Tonnes @ \$20.00/T	=	\$ 58,800.
	Sub-Total		\$186,384.
	e) Engineering & Contingencies: (25% of Sub-Total)		\$ 46,596.
	TOTAL		\$232,982.
	SAY		\$235,000.
2.	Trafalgar Road		
	Length of Construction (Widened Roadway)		
	300 m @ \$150/m	=	\$ 45,000.
	Engineering & Contingencies: (25% of Sub-Total)		\$ 11,250.
	TOTAL		\$ 56,250.
	SAY		\$ 60,000.

SITES B & C		$ Amount
1.	Trafalgar Road	
	Length of Construction (Widened Roadway)	
	300 m @ $150/m =	$ 45,000.
	Engineering & Contingencies: (25% of Sub-Total)	$ 11,250.
	TOTAL	$ 56,250.
	SAY	$ 60,000.

SITE D		$ Amount
1.	Highway 25	
	Length of Construction (Widened Roadway)	
	400 m @ $150/m =	$ 60,000.
	Engineering & Contingencies: (25% of Sub-Total)	$ 15,000.
	TOTAL	$ 75,000.

SITE E			$ Amount
1.	Tremaine Road Reconstruction		
	Length of Construction		
	800 m @ $120/m	=	$ 96,000.
	Engineering & Contingencies: (25% of Sub-Total)		$ 24,000.
		TOTAL	$120,000.
2.	Britannia Road Reconstruction & Realignment		
	Length of Construction		
	2,800 m @ $120/m	=	$336,000.
	Engineering & Contingencies: (25% of Sub-Total)		$ 84,000.
		TOTAL	$420,000.
3.	Highway 25		
	Length of Construction (Widened Roadway)		
	400 m @ $150/m	=	$ 60,000.
	Engineering & Contingencies: (25% of Sub-Total)		$ 15,000.
		TOTAL	$ 75,000.

SITE F

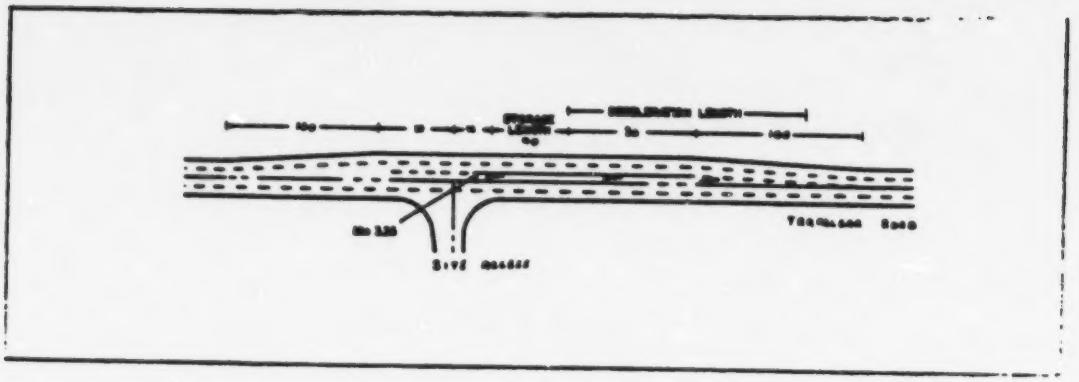
			$ Amount
1.	North Service Road		
	Length of Construction (Widened Roadway)		
	300 m @ $150/m	=	$ 45,000.
	Engineering & Contingencies: (25% of Sub-Total)		$ 11,250.
		TOTAL	$ 56,250.
		SAY	$ 60,000.

DRI:sgr/S375

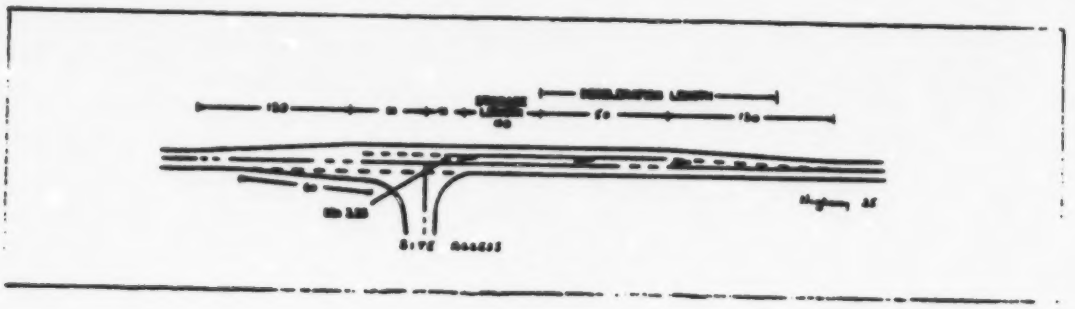
APPENDIX B

Assumed Road Improvements at Site Access Location

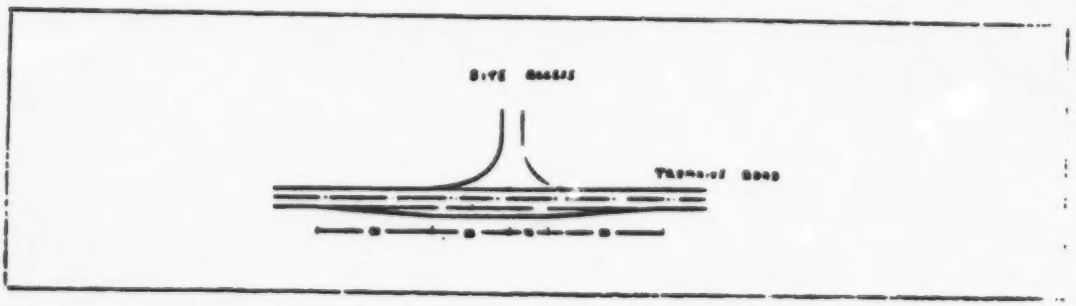
ASSUMED ROAD IMPROVEMENTS AT SITE ACCESS



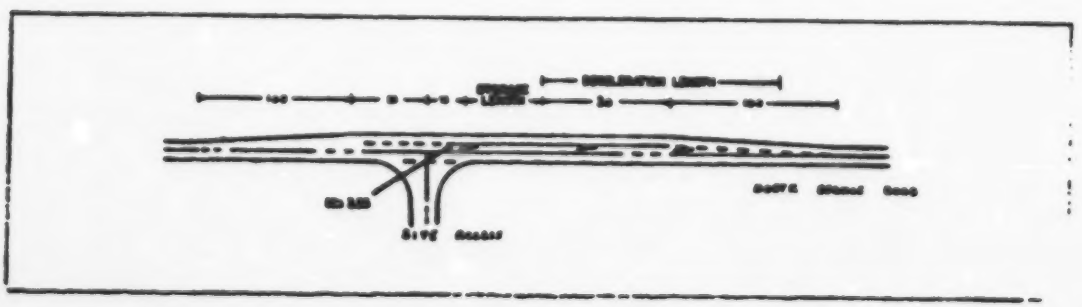
SITES A, B & C



SITE D



SITE E



SITE F

APPENDIX C

Road Maintenance Costs

Giffels

Inter-office

DATE: December 11, 1984

TO: Project File W825904

FROM: D.R. Ivany

RE: Halton Environmental Assessment
Stage 2C
Transportation Analysis
Giffels' Project No. W825904

Road Maintenance Costs

Annual Surface Maintenance = $4,827/km average
(1985 Dollars) (rural type)

Range from $500/km (new road) to $15,730/km (poor condition).

Source: T. Finelli, Region of Halton provided the above figures from the Pavement Management System Network Analysis Project for the Region of Halton; Report #3, Present Status Update and Priority Analysis, March 1984 by Pavement Management Systems Inc.

Average Annual Winter Maintenance = $1,600/km

Source: B. Marshall, Regional of Halton provided above figure based on 1985 Winter Budget.

Based on the above information, a cost figure of $2,500/km/yr was provided to C.N. Watson & Associates as an annual maintenance cost for the proposed new access road to Candidate Site A.

DRI:sgr/373

APPENDIX D

School Bus Assessment

Giffels

Inter-office

DATE: December 11, 1984

TO: Project File W825904

FROM: D. R. Ivany

RE: Halton Environmental Assessment
Stage 2C
Landfill Component
Transportation Analysis
Giffels' Project No. W825904

School Bus Assessment

All school bus routes in the vicinity of the candidate landfill sites were reviewed with representatives of the Halton School Board and Separate School Board.

The major concern identified was the increased potential for accidents during the loading and unloading of school children on roads that presently do not experience high levels of traffic volume. In rural areas, buses are required to pick up children at their homes, therefore, any route with residential frontage is a potential school bus route. Haulage traffic should therefore be designated to other routes, if possible.

Residential frontage also exists on the major highways (e.g. Trafalgar Road and Highway 25) however, the traffic volumes on these roadways are at a level that designation of the roadway as a haul route would be relatively insignificant to the existing safety condition.

During the development of access routes to the candidate sites, local collector roads were avoided where possible. An additional means to mitigate the potential school bus/haulage traffic conflict would be to schedule landfill operations to avoid the times when school buses are on the road (i.e. 7:30 to 8:30 AM, 3:30 to 5:00 PM).

DRI:sgr/374

APPENDIX E

Local Entrances on Main Haul Route (Site E)

Local Entrances on Main Haul Route

Use of Local Roads (Site 'E')

Location	LAND USE: Rural Residential Entrances	LAND USE: Residential/ Residential/ Farm Bldgs. Entrances	Notes
Tremaine North of Site Acess	2	2	Auto Repair Yard
Tremaine South of Site Access	0	2	
Tremaine Total	2	4	
Britannia: Tremaine - Highway 25	0	0	
First Line (close proximity to Britannia)	0	2	
East Side of Britannia/Highway 25 Intersection	2	0	Excavation Equipment Store

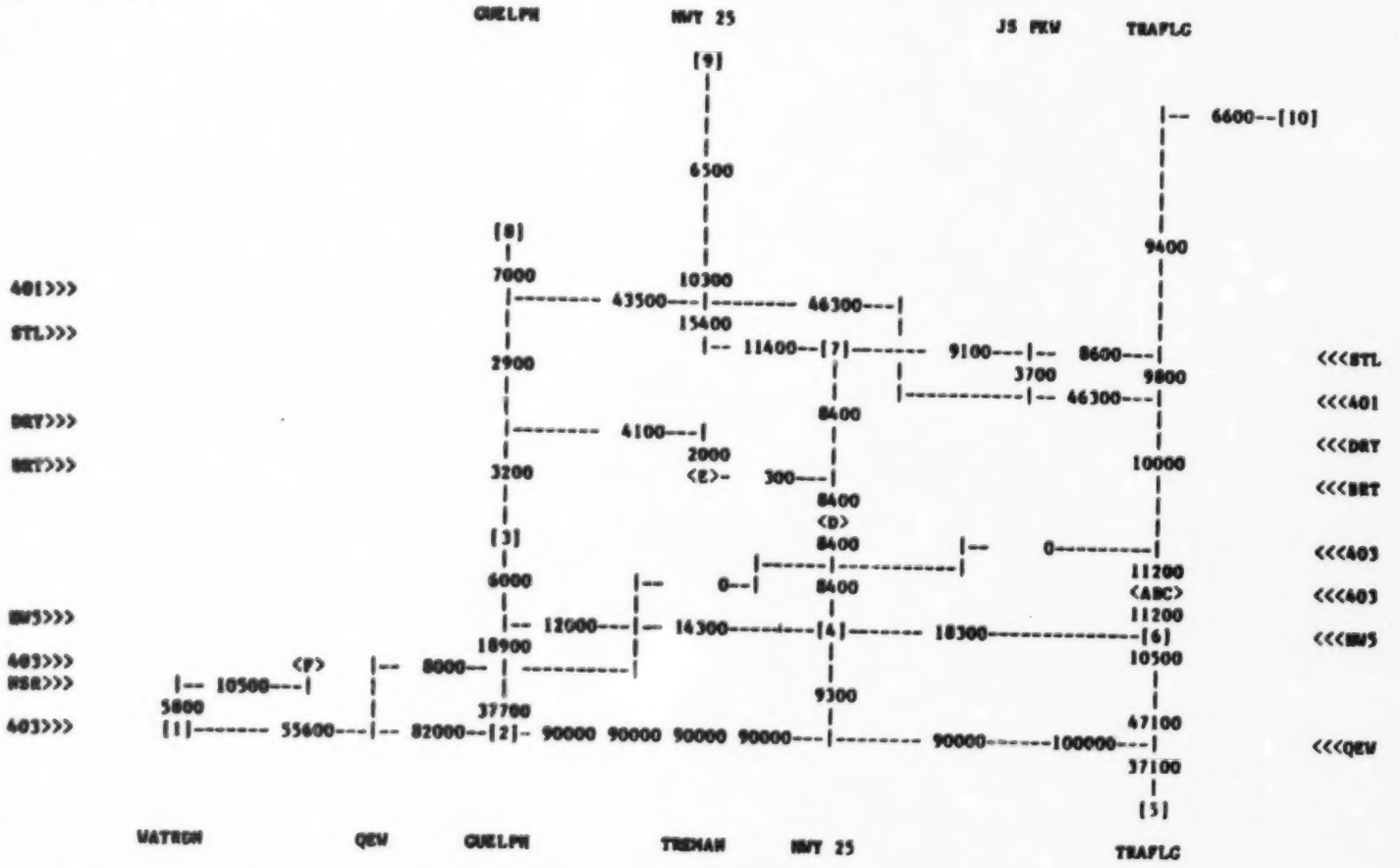
Source: Walker Wright Young
December, 1984

DRI:sgr/S377

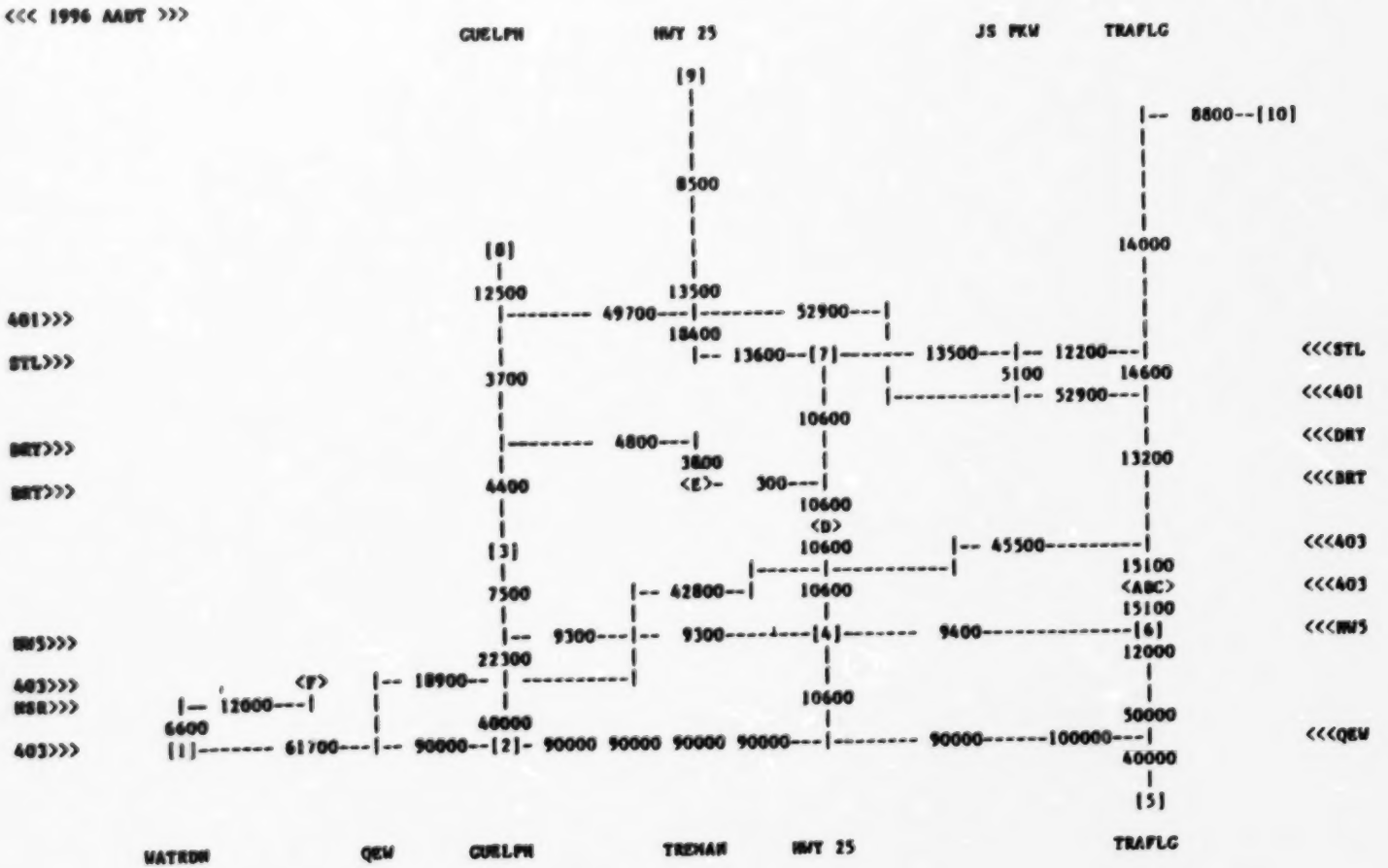
APPENDIX F

Background Traffic

<<< 1988 AADT >>>



DATA SOURCES: 1984 OAKVILLE TRANSPORTATION STUDY UPDATE (FOR ROADS SOUTH OF HWY 5)
1979 NORTH BURLINGTON TRANSPORTATION STUDY (FOR GUELPH LINE SOUTH OF HWY 5)
REGIONAL PUBLIC WORKS ROAD NEEDS 10-YR PROJECTIONS (FOR ROADS NORTH OF HWY 5)



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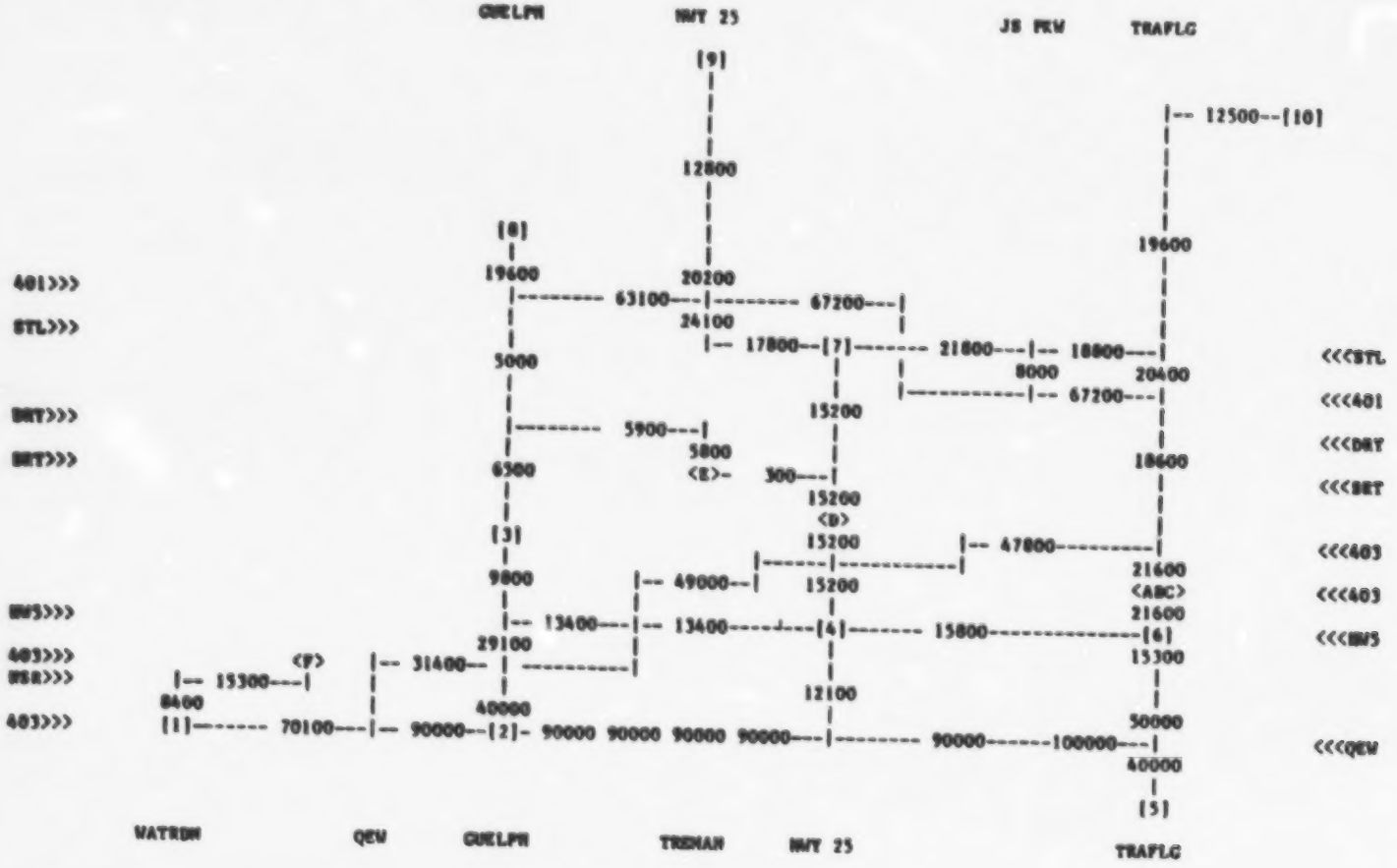
REGIONAL PUBLIC WORKS ROAD NEEDS 10-YR PROJECTIONS (FOR ROADS NORTH OF HWY 5)

<<< 2000 AADT >>>



DATA SOURCES: 1984 OAKVILLE TRANSPORTATION STUDY UPDATE (FOR ROADS SOUTH OF HWY 5)
1979 NORTH BURLINGTON TRANSPORTATION STUDY (FOR GUELPH LINE SOUTH OF HWY 5)
REGIONAL PUBLIC WORKS ROAD NEEDS 10-YR PROJECTIONS (FOR ROADS NORTH OF HWY 5)